

# **MausDB**

**Installation Guide**

**And**

**User Manual**

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# 1 Introduction

## 1.1 ***Definition, purpose and intended use***

### **What is MausDB?**

MausDB is a laboratory mouse information and management system (LMIMS). MausDB has been custom developed for the needs and requirements of the German Mouse Clinic (GMC)<sup>2</sup>.

It has been published<sup>3</sup> and made freely available for the scientific community.

Its purpose is to facilitate all aspects of handling laboratory mice

- by storing all relevant data of a mouse facility including animal data in one central database.
- by providing this data to all users simultaneously on a multi-user access platform.
- by ensuring that information is up-to-date and all users have access to the same information (in contrast to working with distributed spreadsheet files).
- by providing useful overviews and search functions

Its intended use is to comprehensively manage mouse houses ranging from one rack only up to large mouse facilities hosting tens of thousands of mice.

## 1.2 ***Technical information***

MausDB is a web-based CGI application built on Linux, Apache, MySQL and Perl (LAMP).

As MausDB works with database transactions, it makes use of the InnoDB storage engine provided by MySQL. MausDB should also work with any other transactional storage engine or transactional database management system (e.g. PostgreSQL) in principle. Though this has not been tested at all, it might be necessary to adapt SQL statements in order to fully comply with SQL standards or RDBMS-specific “SQL dialects”.

In order to avoid dependency from a single database management system, the whole business logic has been implemented on application level rather than on database level, i.e. stored procedures.

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<sup>3</sup> Maier, H., Lengger, C., Simic, B., Fuchs, H., Gailus-Durner, V., Hrabé de Angelis, M.

**MausDB: an open source application for phenotype data and mouse colony management in large-scale mouse phenotyping projects.** [BMC Bioinformatics 2008, 9:169](https://doi.org/10.1186/1471-2105-9-169)

### **1.3 MausDB features**

MausDB covers most aspects of handling laboratory mice for scientific purposes, including:

- importing mice from external sources
- mouse breeding
  - mating
  - embryo transfer
- weaning
- moving mice (cage and/or rack transfers)
- cage card printing
- locating mice, full rack and cage overview
- collecting and grouping mice in so-called “carts” or cohorts (for statistical purposes)
- genotyping mice (multiple genotypes possible)
- culling mice
- manage experiment licenses
- manage cost center assignment (multiple cost centers possible)
- breeding statistics (per line): sex ratio, litter per mother, average litter size, ...
- mouse phenotyping
  - definition of structured phenotyping workflows
  - definition of phenotyping parameters
  - definition of phenotyping parameter sets (parameters from one assay)
  - schedule phenotyping tasks for single mice or groups of mice on a weekly basis
  - query and manage status of phenotyping tasks
  - upload phenotyping results to database from spreadsheet files
  - extract and export phenotyping results from database to spreadsheet format
  - statistical analysis and visualisation of phenotype data using pre-defined R<sup>4</sup> scripts via the MausDB web interface
- export mouse breeding data to spreadsheet files
- uploading and attaching custom files to single mice or groups of mice, e.g. image files or spreadsheet files

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<sup>4</sup> <http://www.r-project.org>

## **1.4 License**

MausDB has been made available under the terms of the GNU General Public License (GPL). See <http://www.gnu.org/licenses/gpl.html> for more details.

MausDB - a laboratory mouse information and management system

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## **1.5 Before using MausDB**

Carefully read the GNU General Public Licence (see above) under which MausDB has been made available before using MausDB. Please pay particular attention to what the license says about warranty, liability and risk of use.

## 2 Installation

### 2.1 Before you start

This installation guide is based on the use of Ubuntu Linux, version 8.04 LTS, server edition. It is possible to install MausDB on other systems as well (successfully tested with Mac OS X). Package installation procedures, paths and settings may vary and must be adapted when installing MausDB on other systems.

#### Time required

Following this installation guide, a fully functional MausDB server can be installed on any machine from scratch within 60 - 90 minutes. This includes a complete installation of Ubuntu Linux, installation and setup of MausDB and restoring an initial database.

#### Conventions

In the following instructions, two conventions apply:

- \ \ indicates that a command needs to be continued on the same line
- <> indicates a variable, for example a user-defined password

### 2.2 Setting up a Linux system as *MausDB* server

#### 2.2.1 Standard installation of Ubuntu Linux 8.04 LTS, server edition, from CD

The server version of Ubuntu is recommended. Installation CD ISO-images can be downloaded from <http://www.ubuntu.com>. Other Ubuntu versions will most probably work as well but may require slight modifications as package names may be different.

It is recommended to set up a user „**admin**“. This user must belong to the group **admin**, which is necessary to obtain root privileges using **sudo**. When using the **sudo** command, you will be asked for a password. Please provide the password of **admin** here.

When asked for the local time, you may enter “automatic” and enter a time server address.

When using a multiple hard disk system, we recommend the following setup:

disk/device	mountpoint	description
/dev/sda1	/	operating system
/dev/sdb1	/var	mysql database separated from operating system

After finishing the Ubuntu standard installation, **networking must work**, unless the following steps cannot be accomplished.

This installation guide assumes that the following steps are done as user **admin**.

## 2.2.2 X server

The MausDB R interface requires X to be installed. Either choose X to be installed on your system at the very beginning [e.g. by installing a desktop version] or install the package “kubuntu-desktop” (which is quite an excess but will make sure X is running and set up properly). If you choose a desktop ubuntu version that comes with the default Gnome Desktop, this will do fine and you can skip the next step.

### [optional: install kubuntu-desktop]

```
# sudo apt-get install kubuntu-desktop
```

## 2.2.3 ssh installation

### install the open-ssh server and client

```
# sudo apt-get install ssh
```

### [if necessary, restart the ssh daemon]

```
# sudo /etc/init.d/ssh restart
```

After finishing this step, login to the computer must be possible via ssh from a remote machine.

## 2.2.4 Short introduction to apt

Ubuntu Linux makes use of the package management system *apt* to install and manage software packages. A package index is maintained on the local machine. Using this index, the system „knows“ which packages are installed. Prerequisites and dependencies between packages are known and *apt* resolves these dependencies or tells you about problems.

Local package index files are synchronised via the internet with so called repositories or sources. In */etc/apt/sources*, it can be defined, which sources have to be used. By including formerly commented sources, the system can be expanded by other packages.

### Search in the package repository

```
# apt-cache search <searchterm>
```

### Get details about a package

```
# apt-cache show <packagename>
```

### Update the package index

```
# sudo apt-get update
```

### Upgrade the system (will install up-to-date packages)

```
# sudo apt-get upgrade
```

## **2.2.5 [maybe required: de-activate the installations CD as a package source]**

In order to get the latest updates from the remote Ubuntu/debian repositories, */etc/apt/sources.list* must be changed.

```
# sudo nano /etc/apt/sources.list
```

comment out the line starting with: deb cdrom: ...

## **2.2.6 [may be required: Including the „universe“ package sources]**

Some packages are only available using the „universe“ package sources.

```
# sudo nano /etc/apt/sources.list
```

un-comment (activate) the line starting with: deb ... universe and deb-src ... universe

## **2.2.7 Update the package tree**

The package index file (package tree) must be updated in order to set up a system, which is as safe as possible.

```
# sudo apt-get update
```

## **2.2.8 Update the system**

All packages that can be updated, will be updated by typing:

```
# sudo apt-get upgrade
```

## **2.2.9 Installation of apache**

Install the apache web server by typing:

```
# sudo apt-get install apache2
```

## **2.2.10 Installation of mysql**

Install the mysql server by typing:

```
# sudo apt-get install mysql-server
```

You may be asked to give a password for the mysql root user during installation. Please be aware that the mysql root account is different from the system root account.

### **2.2.11 Installation of mailx and postfix**

Install the mail system by typing:

```
# sudo apt-get install mailx
```

Choose “Internet Site” in the following postfix configuration dialog.

### **2.2.12 Installation of ntpdate**

Install the ntpdate client to synchronize system time to time servers:

```
# sudo apt-get install ntpdate
```

### **2.2.13 [maybe required: set a password for the Mysql root user]**

There is a mysql admin user named *root*, which is comparable to the user *sa* in other DBMSs.

**Attention:** mysql *root* is different from the linux *root* user!

**Set the password for mysql root (may be skipped if root password has been set at mysql installation):**

```
# sudo mysqladmin -u root password <new-password>
```

<new-password> is to be replaced by the new password.

### **2.2.14 Install some packages necessary for CPAN**

In order to be able to install Perl modules via CPAN, some additional packages must be installed by typing:

```
# sudo apt-get install ncftp  
# sudo apt-get install lynx  
# sudo apt-get install unzip  
# sudo apt-get install make  
# sudo apt-get install gcc
```

### **2.2.15 [optional: Create a directory for the mysql binary logs]**

Ideally, the binary logs directory should be on a separate hard disk and for this reason independent from the one which hosts the database. **You also can leave everything on default and skip this step.**

If mountpoint / is separated from mountpoint /var:

- **create a directory for the binary logs, e.g. “/mysql\_binlogs”**

- **set correct rights for this directory**

```
# sudo chown mysql:adm /mysql_binlogs
```

### **2.2.16 [optional: Configure MySQL]**

Configuration of mysql is done in the file */etc/mysql/my.cnf*

Before making changes to the configuration, stop mysql:

```
# sudo /etc/init.d/mysql stop
```

**Attention: adapt the entry *server-id*. Every server needs its own ID!**

#### **Change to /etc/mysql**

```
# cd /etc/mysql
```

#### **Make a backup copy of the config file**

```
# sudo cp my.cnf my.cnf.old
```

#### **Edit /etc/mysql/my.cnf**

```
# sudo nano /etc/mysql/my.cnf
```

#### **Add or change the following lines:**

[client]	
default-character-set=utf8	(add <sup>5</sup> )
[mysqld]	
character-set-server=utf8	(add <sup>5</sup> )
default-collation=utf8_unicode_ci	(add <sup>5</sup> )
init-connect='SET NAMES utf8'	(add <sup>5</sup> )
server-id = 1	(possibly change)
log-bin = /mysql_binlogs/mysql-bin.log	(possibly change)
binlog-do-db = mausdb	(possibly change)
binlog-ignore-db = mausdb_demo	(possibly change)

Choose binary logging for every MausDB database (but not the blob databases).  
After making changes to the configuration, you need to restart mysql:

```
# sudo /etc/init.d/mysql start
```

---

<sup>5</sup> if you don't have to deal with special characters (Umlaut, accents, ...) you may skip this

### **2.2.17 Configure CPAN**

Using CPAN, Perl modules can be easily downloaded and installed from the CPAN repository or its mirrors. Prerequisites and dependencies are resolved automatically.

#### **Short introduction to CPAN**

##### **Start CPAN**

```
# sudo cpan
```

or

```
# sudo perl -MCPAN -e shell
```

##### **Initial configuration**

When starting CPAN for the first time, you need to answer some questions, which are self-explanatory. If cpan is slow, try using passive ftp:

```
# sudo env FTP_PASSIVE=1 cpan -i Net::FTP
```

##### **Attention:**

When asked for “Policy on building prerequisites (follow, ask or ignore) [ask]”, answer “follow”

##### **Installing Perl modules using CPAN**

```
cpan> install Date::Calc
```

### **2.2.18 Installation of additional packages and Perl modules**

If installation via CPAN fails, pre-compiled modules can be installed from the Ubuntu package repository:

[Example: # sudo apt-get install libdate-calc-perl]

#### **The following packages are necessary in order to run MausDB**

##### **via apt**

perl-GD (pre-compiled Perl-GD-Modul)

```
# sudo apt-get install libgd-gd2-perl
```

libgd-devel

```
# sudo apt-get install libgd2-xpm-dev
```

```

smbfs

# sudo apt-get install smbfs

DBI with DBD::mysql

# sudo apt-get install libdbd-mysql-perl

CGI.pm

# sudo apt-get install libcgi-perl
[#sudo apt-get install libcgi-pm-perl if above fails]

CGI::Session

# sudo apt-get install libcgi-session-perl

Date::Calc

# sudo apt-get install libdate-calc-perl

Digest::MD5

# sudo apt-get install libmd5-perl

Mail::Sendmail

# sudo apt-get install libmail-sendmail-perl

DBD::Excel

# sudo apt-get install libdbd-excel-perl

via CPAN

GD::Barcode

# sudo env FTP_PASSIVE=1 cpan
cpan> install GD::Barcode

Spreadsheet::WriteExcel::Simple

# sudo env FTP_PASSIVE=1 cpan
cpan> install Spreadsheet::WriteExcel::Simple

Spreadsheet::ParseExcel

# sudo env FTP_PASSIVE=1 cpan
cpan> install Spreadsheet::ParseExcel::Simple

Array::Transpose
# sudo env FTP_PASSIVE=1 cpan
cpan> install Array::Transpose

[remark: this may require installation of modules Test::Pod and
Test::Pod::Coverage]

```

## 2.2.19 Installation of packages required for statistics and visualisation

## Install R

```
# sudo apt-get install r-base
```

### Install additional CRAN modules via apt

```
# sudo apt-get install r-cran-tseries
# sudo apt-get install r-cran-lattice
# sudo apt-get install r-cran-dbi
# sudo apt-get install r-cran-rmysql
# sudo apt-get install r-cran-gdata
# sudo apt-get install r-cran-gmodels
# sudo apt-get install r-cran-gplots
# sudo apt-get install r-cran-gregmisc
```

## 2.2.20 Install xvfb (Virtual Framebuffer ‘fake’ X server)

```
# sudo apt-get install xvfb
```

[may be required: add path to xvfb to xvfb-run]  
# sudo nano /usr/bin/xvfb-run

Look for line PATH=..., add /bin to the path. It should read:

```
PATH=$PATH:/usr/bin/X11:/usr/X11R6/bin:/bin
```

## 2.2.21 Synchronize the system time to a time server

[remark: the following step can be skipped if synchronization to a time server has been chosen during installation of Ubuntu].

Set up a cron job to run ntpdate

```
# sudo crontab -e
```

**Enter the following line:**

```
0 2 * * * /usr/sbin/ntpdate <time_server>
```

## 2.2.22 Switch off log-flushing by the Ubuntu log-rotate service

By default, mysql binary logs are flushed once a day. This is done by the log-rotate service. Binary log files that are generated this way are not copied to a safe place by the backup script. Comment out everything in **/etc/logrotate.d/mysql-server** to stop this service.

## 2.3 Installation of MausDB

### 2.3.1 Download MausDB installation files

Download MausDB\_vx.x.tar.gz from <http://jupiter.helmholtz-muenchen.de>

Extract downloaded file into /home/admin/mausdb:

```
# tar -xvzf MausDB_vx.x.tar.gz
```

Please make sure that the resulting directory structure looks like this (the following instructions are based on this structure). It may be necessary to rename the directory:

```
# mv mausdb_v1.5 mausdb
```

```
/home/admin/mausdb/SQL
/home/admin/mausdb/SQL/check_consistency
/home/admin/mausdb/SQL/delete
/home/admin/mausdb/SQL/insert
/home/admin/mausdb/SQL/setup_database
/home/admin/mausdb/SQL/select
/home/admin/mausdb/SQL/update
/home/admin/mausdb/code
/home/admin/mausdb/code/var
/home/admin/mausdb/code/var/maus_connect
/home/admin/mausdb/code/var/www
/home/admin/mausdb/code/var/www/mausdb
/home/admin/mausdb/code/var/www/mausdb/css
/home/admin/mausdb/code/var/www/mausdb/images
/home/admin/mausdb/code/var/www/mausdb/maustmp
/home/admin/mausdb/code/var/www/mausdb/static_content
/home/admin/mausdb/code/var/www/mausdb/static_pages
/home/admin/mausdb/code/var/www/mausdb/R
/home/admin/mausdb/code/var/www/mausdb/R/output
/home/admin/mausdb/code/usr
/home/admin/mausdb/code/usr/lib
/home/admin/mausdb/code/usr/lib/cgi-bin
/home/admin/mausdb/code/usr/lib/cgi-bin/mausdb
/home/admin/mausdb/code/usr/lib/cgi-bin/mausdb/files
/home/admin/mausdb/code/usr/lib/cgi-bin/mausdb/logs
/home/admin/mausdb/code/usr/lib/cgi-bin/mausdb/sessions
/home/admin/mausdb/code/usr/lib/cgi-bin/mausdb/uploads
/home/admin/mausdb/info
/home/admin/mausdb/services
```

### 2.3.2 Settings based on a typical Ubuntu installation

Assumption made for the following steps:

apache htdocs folder is located at:

*/var/www/*

apache cgi folder is located at:

*/usr/lib/cgi-bin*

connection parameters:

*/var/maus\_connect*

apache system user:

‘www-data’ (group ‘www-data’)

### **2.3.3 Install the MausDB script files**

**Copy the directories and files from the above directories to their target directories (/var, /var/www, /usr/lib/cgi-bin) and set ownerships to www-data:www-data**

```
# cd /var  
# sudo cp -R /home/admin/mausdb/code/var/* .  
  
# cd /var/www  
# sudo cp -R /home/admin/mausdb/code/var/www/* .  
# sudo chown -R www-data:www-data mausdb*  
  
# cd /usr/lib/cgi-bin  
# sudo cp -R /home/admin/mausdb/code/usr/lib/cgi-bin/* .  
# sudo chown -R www-data:www-data mausdb*
```

### **2.3.4 Configuration of MausDB**

**adapt connection parameters in /var/maus\_connect/DB\_connect.pm**

```
# sudo nano /var/maus_connect/DB_connect.pm  
enter suitable settings (username & password)
```

**adapt MausDB config files**

```
# sudo nano /usr/lib/cgi-bin/mausdb/config.rc  
enter suitable settings
```

### **2.3.5 Create the directories for the backup system**

Some directories must be created for the backup system:

```
# cd /home/admin  
# mkdir /home/admin/backup  
# mkdir /home/admin/backup/daten  
# mkdir /home/admin/backup/daten/<yourfacility>  
# mkdir /home/admin/backup/logs  
# mkdir /home/admin/backup/logs/<yourfacility>
```

### **2.3.6 Installation of the backup script**

**copy backup script and set appropriate ownerships**

```
# cd /home/admin/backup  
# cp /home/admin/mausdb/services/backup.pl .  
# cd ..  
# sudo chown -R admin:admin backup
```

## **adapt settings in backup.pl according to your system and paths**

```
# sudo nano backup/backup.pl
```

Although this should be rather self-explanatory, some help and explanation:

All settings are stored in a 2-dimensional global hash named **%backup\_data**. The first, numeric key describes the database to be backed up, the second, text key describes the specific setting for this database.

### **Sections:**

```
$backup_data{0}{...}      global settings for all databases
$backup_data{1}{...}      settings for first database
$backup_data{2}{...}      settings for second database
...
...
```

Below this settings block, there are some if (...) entries. In order to include a database into the backup script, you need to generate a settings block and suitable if (...) entry.

## **setup cron job to run backup.pl automatically**

```
# sudo crontab -e
```

**Enter the following lines** (\\" means: into same line)

```
0 23 * * * /usr/bin/perl /home/admin/backup/backup.pl \\ do_backup=yes >>
/home/admin/backup/backup.log
0 8-18 * * 1-5 /usr/bin/perl /home/admin/backup/backup.pl \\
flush_bin_logs=yes >> /home/admin/backup/backup.log
```

will run a full dump at 23:00 every night

will flush binary logs every hour at 8:00-18:00 at monday-friday

## **2.3.7 Installation of the checkup script for daily control of database integrity**

### **copy checkup script and set appropriate ownerships**

```
# cd /home/admin/backup
# cp /home/admin/mausdb/services/checkup.pl .
# cd ..
# sudo chown -R admin:admin backup
```

adapt settings in backup.pl according to your system and paths (see above):

```
# sudo nano backup/checkup.pl
```

In order to setup cron job to run checkup.pl automatically proceed as described above for backup script.

**At this point, all software needed to run MausDB should be installed and configured on your system. The following steps describe how to set up a MausDB installation.**

## 3 Setting up a new mouse facility (for admin users)

### 3.1 Restoring from a backup dump file

In case you had MausDB already running and need to restore the database from a dump file on a different server:

```
# mysql -u <username> -p<password> mausdb < dumpfile.sql
```

If all your data is contained in dumpfile.sql – that's it.

### 3.2 Starting from scratch

In case you install MausDB for the first time, the following steps describe how to do that.

#### 3.2.1 Create the MySQL databases

##### login to mysql as mysql-root (remember: this is not the same root as system root)

```
# mysql -u root -p<password>
```

Attention: no whitespace between -p and the password!

##### create database mausdb and blob-database

```
mysql> create database mausdb;
mysql> create database mausdb_blobs;
```

##### create database user for MausDB (\\" means: into same line)

```
mysql> grant all on mausdb.* to '<user>'@'localhost'          \\
       identified by '<password>';
mysql> grant all on mausdb_blobs.* to '<user>'@'localhost'      \\
       identified by '<password>';
```

##### update privileges table

```
mysql> flush privileges;
```

quit the mysql command mode

```
mysql> quit
```

#### 3.2.2 Creating database tables and functions using DDL scripts

Create tables by running create table DDL script (\\" means: into same line):

##### Create main MausDB tables

```
# mysql -u <user> -p<password> mausdb <           \\
 /home/admin/mausdb/SQL/setup_database/create_tables_mausdb.sql
```

### Create MausDB blob database table

```
# mysql -u <user> -p<password> mausdb_blobs <      \\
/home/admin/mausdb/SQL/setup_database/create_tables_mausdb_blobs.sql
```

### Some user-defined functions

```
# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/mr2string.sql

# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/get_number_of_cagemates.sql

# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/get_simple_value_for_mouse_p_ps.sql

# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/mice-genotypes.sql
```

Now all tables are defined - but empty. Some initial values need to be in the database in order to start. This is described in the following steps.

### 3.2.3 Load initial settings into database

Some initial and essential settings are set in the following steps by loading pre-filled tables into the database. (\\" means: into same line)

#### Master data for days

```
# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/days.sql
```

#### Master data for settings

```
# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/settings.sql
```

#### Master data for death\_reasons

```
# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/death_reasons.sql
```

#### initial admin user account (username: admin, password: mausdb)

```
# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/initial_admin_account.sql
```

#### initial mylocks

```
# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/mylocks.sql
```

#### [optional: examples for phenotype and routine task workflow management and worklist scheduling]

```
# mysql -u <user> -p<password> mausdb <      \\
/home/admin/mausdb/SQL/setup_database/parametersets.sql
```

### 3.3 Logging in to MausDB as „admin“

Assuming you installed MausDB on a computer named „mausdbwww“ following the instructions given in this manual, you should be able to log in to the initial system.

Just use Mozilla Firefox to access the following URL:

<http://mausdbwww.yourdomain/cgi-bin/mausdb/mausdb.cgi>

Enter „admin“ as **username** and „mausdb“ as **password** (these have been defined in the previous step, see above). Don't forget to change the password as soon as possible.

### 3.4 Defining your mouse facility

In this step, all settings that are specific to your mouse facility need to be defined.

#### 3.4.1 Defining rooms and racks (admin function)

As MausDB manages all rooms, racks and cages of your mouse facility, the racks must be defined beforehand. As admin, choose **settings → new rack**.

The screenshot shows the MausDB DEMO interface with the following details:

- Top navigation bar: Logged in as admin ([log out](#)) | Help
- Top right: View mouse
- Middle top: 0 mice in cart | Home | racks&cages | search&find | import | reports | settings
- Main title: Define a new rack
- Section title: Please specify details for your new rack
- Form fields (with examples and descriptions):
  - rack name**: example: "01" for rack 01 in room 1234 | Please enter the name of the new rack
  - room**: example: "1234" if rack is placed in room in room 1234 | Please specify the room in which the rack is placed.
  - building**: example: "35" if rack is placed in a room in building 35 | Please specify the building in which the rack is placed.
  - subbuilding**: example: "A" if rack is placed in a room in subbuilding A of building 35 | Please specify the subbuilding in which the rack is placed.
  - capacity**: example: "42" if the rack has a capacity for 42 cages | Please specify the rack capacity (max. number of cages in this rack).
  - is rack active?**:  yes  no | example: "yes" if you want to use this rack immediately | Please specify if the rack is active or not. Not active means that the rack is defined, but cannot be used in MausDB.
  - project**: Projekt\_1 | Please choose the project to which the rack is assigned.
  - is rack internal?**:  yes  no | example: "yes" | Please specify if the rack is internal or not. Internal means that mice in this rack live outside your facility.
  - rack code**: example: "1300" if the code for this animal facility is 1300 | [Optional: Please enter a code for the facility in which the new rack is placed]
  - rack comment or description**: example: "mating rack" | [Optional: Please enter a comment for the new rack]
- Bottom buttons: define new rack | resetform | cancel

Figure 1: Defining a new rack by entering rack specific information. Please take care that the total number of cages corresponds to the total rack capacity.

### 3.4.2 Defining cages (admin function)

As MausDB manages all rooms, racks and cages of your mouse facility, the cages (the cage pool) must be defined beforehand. MausDB does not manage individual physical cages but a pool of cages that are tagged with a cage id. Therefore, it is required that the number of cages defined (i.e. the size of the cage pool) corresponds to the total capacity of all racks defined.

As admin, choose *settings* → *new cages*.

Define new cages

Please specify:

cage number	<input type="text"/>	example: "100" if you want to define 100 new cages	Please enter the number of cages to be defined in the database
cage capacity	<input type="text" value="5"/>	example: "5" if the cages have a capacity for 5 mice	Please specify the cage capacity (max. number of mice per cage).
cages active?	<input checked="" type="radio"/> yes <input type="radio"/> no	example: "yes" if the cages should be active immediately	Please specify if the cages should be active or not. Not active means that the cage are defined, but cannot be used in MausDB.

Figure 2: Defining new cages. Please take care that the total number of cages corresponds to the total rack capacity.

### 3.4.3 Defining projects (admin function)

MausDB uses projects in two ways. Every user is assigned to one or more projects. Every rack and every mating is assigned to exactly one project. In this context, project affiliation determines the view on racks and matings a user gets after logging in. Per default, a filter is set so that only those racks are shown that belong to user's projects. At any time, every user can decide to view all other racks too. The same is true for matings.

Phenotype results are strictly managed by projects. They are only presented to the user if they belong to a user's project or if they are public.

As admin, choose *settings* → *new project*.

Create a new mouse project

Project info

project name	<input type="text"/>	Please enter the name of the new mouse strain
project shortname	<input type="text"/>	Please enter the short name of the new project
project description	<input type="text"/>	Please enter a description for the new project
parent project	<input type="text" value="Projekt_1"/>	Please assign a parent project for the new project

Figure 3: Define a project – name, short name, description and parent project may be given.

### 3.4.4 Defining experiments (admin function)

In this context an experiment is a description of examinations that shall be performed on laboratory animals which require a concession from any kind of regulatory authority. It is

recommended to enter the reference number as experiment name. As there are no comment fields the experiment name should be self-documenting.

In order to track experiment assignment of individual mice, experiment need to be defined.

As admin, choose **settings** → **new experiment**.

Create a new experiment

Experiment info

experiment name  Please enter the name of the new experiment

define new experiment reset form cancel

Page generated on Mon Apr 30 14:28:57 2007

**Figure 4:** Define a new experiment – only the experiment name is needed.

### 3.4.5 Defining cost centres (admin function)

You may want to calculate the sum of days mice were housed in your facility in order to charge the costs of animal husbandry to someone.

In order to track cost centre assignment of individual mice, cost centres need to be defined.

As admin, choose **settings** → **new cost centre**.

Logged in as admin ([log out](#)) **MausDB DEMO** [Help](#)

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

Create a new mouse cost centre

Cost centre info

cost centre name	<input type="text"/>	Please enter the name of the new cost centre
cost centre number	<input type="text"/>	Please enter the number of the new cost centre
cost centre description	<input type="text"/>	

define new cost centre reset form cancel

Page generated on Mon Apr 30 14:30:39 2007

**Figure 5:** Define a new cost centre – name, number and description need to be given.

### 3.4.6 Defining users (admin function)

Working as a multi-user system with role-specific functionality and account-specific default views and privileges, MausDB requires the definition of user accounts.

As admin, choose **settings** → **new user**.

Logged in as admin ([log out](#))

**MausDB DEMO**

 0 mice in cart

[View mouse](#)

[Home](#) | [racks&cases](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

**Create a new user account**

**MausDB account**

username	<input type="text"/>	Please enter the username for the new account
password	<input type="text"/>	Please enter the password for the new account
admin rights?	<input type="checkbox"/>	Decide if new account will have admin rights
user project(s)	<input type="checkbox"/> Projekt_1	New user is assigned to which project(s)?
comment	<input type="text"/>	
	Please enter a comment for the new account	

**Contact**

title	first name	last name	sex
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/> male <input type="radio"/> female
function	type		external
<input type="radio"/> scientist <input type="radio"/> technician <input type="radio"/> animal care taker	<input type="radio"/> person <input checked="" type="radio"/> institution	<input type="checkbox"/>	
e-mail address(es)	<input type="text"/>		
comment	<input type="text"/>		

**Address**

institution				
<input type="text"/>				
unit		other info		
<input type="text"/>		<input type="text"/>		
street	postal code	town	state	country
<input type="text"/>				
phone	fax			
<input type="text"/>	<input type="text"/>			
comment	<input type="text"/>			

[create new user](#) [reset form](#) [cancel](#)

Page generated on Mon Apr 30 14:33:15 2007

Figure 6: Define a new user account – lots of information can be entered.

### 3.4.7 Defining genotypes (admin function)

In order to assign genotypes to mice, the distinct genotype flags (e.g. „+/-“ „+/-“,...) need to be defined.

As admin, choose *settings* → *new genotype*.

Logged in as admin ([log out](#)) [Help](#)

**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Create a new genotype

Genotype info

**genotype**  Please enter the new genotype

[define new genotype](#) [resetform](#) [cancel](#)

Page generated on Wed May 2 11:02:40 2007

**Figure 7: Define a genotype – something like „+/+“, „+/-“, „wildtype“, ... can be entered.**

### 3.4.8 Configuring email address(es) for admin user(s)

In some cases, MausDB automatically sends email notifications to defined recipients, e.g. upon the generation of new mouse lines via the web user interface.

To this end, email addresses for notification recipients need to be defined in the database.

#### Start the mysql console

```
# mysql -u <user> -p<password> mausdb
```

#### Define email addresses(es)

```
mysql> update settings
      set setting_value_text = '<email address>'
      where setting_item = 'admin_mail';
```

## 4 Working with MausDB (for all users)

### 4.1 Some basic concepts

There are some basic concepts that you need to understand before working with MausDB. At least, it makes working with MausDB much easier...

#### 4.1.1 Everything has an ID

Everything needs to have an ID in databases. This is also true for MausDB, since MausDB is a database application.

Every mouse has an 8 digit numeric mouse ID in MausDB. It is the main and unique identifier of a mouse in the system. Every mouse-specific data and information is attached to the mouse ID. In other words: there is no concept of “anonymous” mice in MausDB.

The same is true for all other entities in MausDB, where entity means a data representation of physical (rooms, racks, cages, ...) or abstract (matings, projects, ...) objects.

#### 4.1.2 How mice get into MausDB: import and weaning

A mouse can enter MausDB in either of three ways:

- by **import** from an external source. All mouse-specific properties have to be defined at import time.
- by **weaning** litter, where litter is defined as the set of siblings originating from a mating that has been defined in MausDB. Most properties are inherited
- by **embryo transfer** (which is a special case of mating/weaning)

#### 4.1.3 Two worlds: „real world“ vs „database world“

As every other comparable database application, MausDB uses a structured database model of the real world (i.e. the physical mice, cages, racks, rooms and other relevant things like users, projects, genotypes, ...) to store, link and display data.

Of course, a precondition for proper function of MausDB is congruence of information in both worlds. For example, a mouse is physically moved from cage 1234 to cage 2345. After that “real world” action, this cage transfer has also to be performed in the “database world”, i.e. MausDB, in order to reconstitute a proper database.

One basic principle is not to disallow actions in MausDB that can be done in the real/physical world, but rather only display a warning. Also managing grants to allow/disallow actions (kill, move, ...) on a user/project base makes no sense if there are no such mechanisms in the real world. This works well in the German Mouse Clinic.

## 4.2 Getting started...

### 4.2.1 Logging in to MausDB

In order to work with MausDB, you need to login in to the application. Point your Mozilla Firefox browser to the appropriate URL given by your administrator (e.g. „<http://mausdbwww.yourdomain/cgi-bin/mausdb/mausdb.cgi>“). Enter username and password for your account to get access to MausDB.

Welcome to MausDB

Please log in

user name

password

Page generated on Mon Apr 30 13:24:48 2007

Figure 8: MausDB authentication screen – login to specific user account is required.

### 4.2.2 The „Home“ area

Following authentication, a user-specific „Home“ view is displayed. User and project specific information is displayed here.

Logged in as admin ([log out](#))

1 2 MausDB DEMO 3 Help

0 mice in cart

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

Welcome MausDB Admin

Currently, no litters to be weaned from your screen(s) 4

Currently, no order lists from your screen(s) [\[all screens\]](#) 5

Page generated on Mon Apr 30 14:51:55 2007

Figure 9: User-specific „Home“ area. Area 1 shows login information and the log out button as well as the cart symbol and cart information. Area 2 is the main navigation bar. Area 3 contains a help link and the mouse quickfinder form. Area 4 can contain a list of user-assigned litters. Area 5 can contain a list of scheduled user tasks.

The next figure shows an example where litters and tasks are scheduled:

Logged in as admin ([log out](#)) Help

**MausDB DEMO**

 0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Welcome MausDB Admin

Litters to be weaned from your screen(s)

litter ID	project	strain	line	born	age	cage	males	females	comment
4. litter from mating 384	Projekt_1	-	ABC-129	06.04.2007	24	1002/13-0181	4	3	
3. litter from mating 411	Projekt_1	-	HJ-A-B6	07.04.2007	23	1002/14-0294	2	2	
4. litter from mating 406	Projekt_1	-	ABC-C3H	07.04.2007	23	1002/09-0095	2	4	
4. litter from mating 392	Projekt_1	-	C3HeB/FeJ	12.04.2007	18	1001/08-0107	3	2	
5. litter from mating 366	Projekt_1	-	C57BL/6J	14.04.2007	16	1001/08-0147	3	3	
3. litter from mating 423	Projekt_1	-	GHI-B6	16.04.2007	14	1001/06-0347	4	3	

---

Order lists for [\[your screen\(s\)\]](#) [\[all screens\]](#)

order list name	parameterset	status	mice			
Scheduled to week 19/2007 (Monday: 07.05.2007)						
ABC-FLP-CON	Mate	2007-05-07	admin	Mate	ordered	2
Scheduled to week 18/2007 (Monday: 30.04.2007)						
ABC-129	Sperm-freeze	2007-04-30	admin	Sperm-freeze	ordered	1

Page generated on Mon Apr 30 15:13:18 2007

**Figure 10:** User-specific „Home“ area with examples. Six litters assigned to the user’s project have been reported to MausDB. Litters that are ready to wean (i.e. 21 days or older) are displayed in red. Clicking the link in the leftmost column directly leads to the weaning dialog. Two tasks have been scheduled for the user. The tasks are ordered by their scheduled week. Clicking the link directly leads to the task list where the task list can be viewed or modified.

#### 4.2.3 Changing the password

The password can be changed at any time via **settings** → **change password**. The password should be changed during the first MausDB session or after an administrator set a new password, respectively. In either case, the previous password must be entered before entering the new password twice. After changing the password, a login is enforced.

Logged in as admin ([log out](#)) Help

**MausDB DEMO**

 0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Change password

Please enter old password and new password (twice)

old password	<input type="text"/>
new password	<input type="text"/>
repeat new password	<input type="text"/>

Warning: pressing the <changing password> button will terminate the current session. You will have to log in again using your new password.

Page generated on Mon Apr 30 13:27:11 2007

**Figure 11:** The „Change password“ - screen.

### 4.3 The Quickfinder tool – find mice and cages

Using the quickfinder input window (upper right corner of the MausDB user interface), you can access details about a specific mouse or a cage very fast. Just enter the 8 digit mouse ID or a cage ID into the form and press the “*View mouse/cage*” button. Alternatively, you may place the cursor into the form and read a mouse ID or cage ID barcode with a barcode reader from a printed cage card.

In either case, entering a valid mouse ID from an existing mouse will result in being forwarded to the “mouse details” or the cage view (see 4.6) of this particular mouse/cage.

### 4.4 Locating mice – browse “racks&cages”

Locating mice by browsing racks and cages is a straight forward approach since it does not require prior knowledge about mice such as line, sex, or genotype.

#### 4.4.1 Rack overview

Choose *racks&cages* from the main menu.

The screenshot shows the MausDB DEMO interface. At the top, there's a navigation bar with links for Home, racks&cages, search&find, import, reports, and settings. A "View mouse" button is also present. Below the navigation, a "Rack overview" section includes a search bar for cage numbers. The main content is a table titled "Showing active racks" showing the status of various racks across different rooms. The table has columns for Room/racks, total capacity, in use/free, cage slots in use (\*), total number of mice in this rack, project assignment, and comment (shortened). The data is organized by room (e.g., 0000, 1001) and then by rack number (e.g., Virtual, rack\_00, rack\_01 through rack\_08). The table shows a total of 162/198 cages and 353 total mice. At the bottom of the page, a note indicates it was generated on Mon May 7 14:29:25 2007.

Room racks	Cage summary			total number of mice in this rack	project assignment	comment (shortened)
	total capacity	in use/free	cage slots in use (*) and free (.)			
<b>0000</b> Virtual						
rack_00	40	00 / 40	.....	0	Projekt_1	virtual rack
<b>1001</b> Floor_A						
rack_01	40	17 / 23	*****.....	40	Projekt_1	
rack_02	40	26 / 14	*****.....	61	Projekt_1	
rack_03	40	23 / 17	*****.....	52	Projekt_1	
rack_04	40	00 / 40	.....	0	Projekt_1	
rack_05	40	24 / 16	*****.....	46	Projekt_1	
rack_06	40	29 / 11	*****.....	66	Projekt_1	
rack_07	40	14 / 26	*****.....	26	Projekt_1	
rack_08	40	29 / 11	*****.....	62	Projekt_1	
	<b>cages</b>	<b>162/198</b>		<b>total mice</b>	<b>353</b>	

Figure 12: The rack overview lists all user assigned racks per default. The leftmost column contains clickable rack links, ordered by room. The second column shows the rack capacity (number of cage slots).

#### 4.4.2 Rack view

Following a link from the rack overview an individual rack with all current cages can be displayed.

Rack details																																																																																																																																																																																																																																									
Overview: rack 01 in room 35-Floor_A-1001																																																																																																																																																																																																																																									
Cages		total capacity		in use/free		cages in use (*) and free cages (.)		total number of mice in this rack	project assignment	info																																																																																																																																																																																																																															
40		11 / 29		*****.....				28	Projekt_1																																																																																																																																																																																																																																
<b>Cages currently in this rack</b>																																																																																																																																																																																																																																									
+ (expand all)																																																																																																																																																																																																																																									
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Figure 13: Rack details view. In this view, all cages of a chosen rack can be viewed showing one cage per row (condensed view, e.g. cage 0005). A click on the cage id in the first column leads to a detailed cage view. Clicking the „cage“ link will start a cage transfer dialog (see 5.10), whereas clicking „print card“ will open a cage card preview in a new window (see 4.4.4).

Cages can be expanded using the „+“ switch on the left hand side of the cage id in the first column (expanded view, e.g. cage 0012). Basic information of individual mice is displayed along with a clickable mouse ID, which leads to a mouse details view (see 4.6). Clicking the „mouse“ link will start a mouse transfer dialog (see 5.9). Mice can be selected across cages and be put in the cart (see 4.5) by checking the box in the second column and pressing the „Add selected mice to cart“ button.

Some actions can be applied on selected mice using the buttons in the bottom row, e.g. „kill“ (see 5.11), „mate“ (see 5.1), „genotype“ (see 5.6).

#### 4.4.3 Cage view

Following a link from the rack view or any other mouse table, an individual cage with all mice can be displayed.

Cage view  or view another cage

Cage 0018 (placed in rack 1001/01, Projekt\_1) contains 2 mice

[print cage card](#) [move cage](#) [cage history](#)

Current cage color:  Change to:

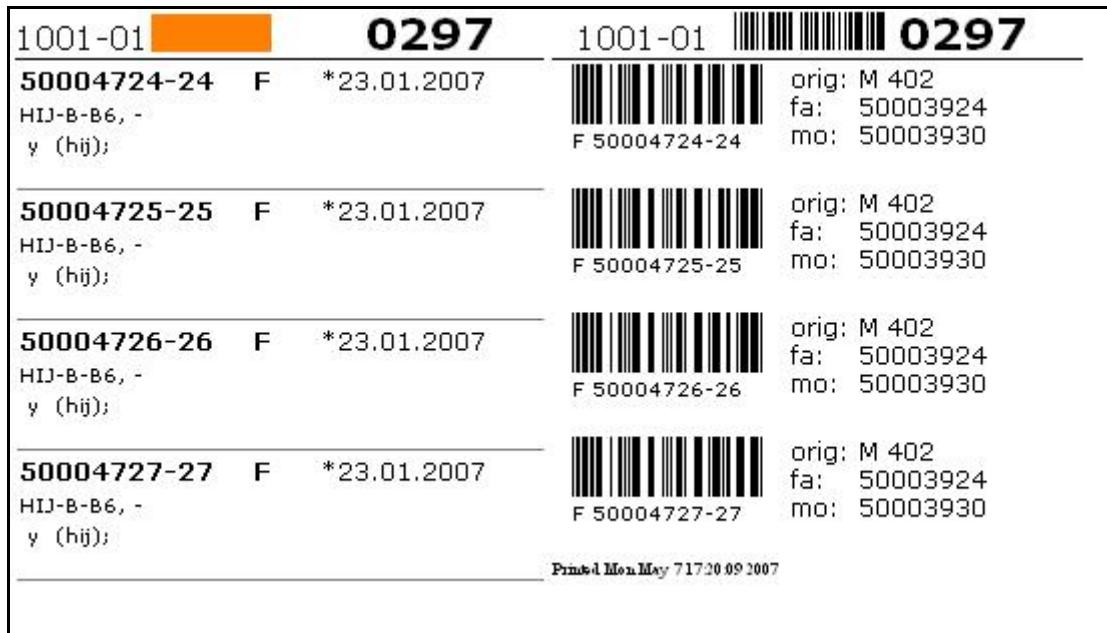
#	<input type="checkbox"/>	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage	comment (shortened)	<a href="#">move mouse</a>
1	<input type="checkbox"/>	50005138	38	f	13.03.2007	55	-	y	-	HIJ-B-B6	1001/01-0018		<a href="#">move mouse</a>
2	<input type="checkbox"/>	50005139	39	f	13.03.2007	55	-	y	-	HIJ-B-B6	1001/01-0018		<a href="#">move mouse</a>

What do you want to do with mice selected above?

**Figure 14: Cage view.** Basic details of all mice in a cage are displayed along with their clickable mouse ID, which will lead to a mouse details view (see 4.6). Clicking the „move mouse“ link will start a mouse transfer dialog (see 5.9). Again, mice can be selected for actions available on the bottom button bar or for being put in the cart (see 5.5). Just on top of the mice table, there are links for printing a cage card (see 4.4.4), for starting a cage transfer dialog (see 5.10), or for viewing the history of the cage ID (see 4.7.2). The color of the cage card color bar can be adjusted as well.

#### 4.4.4 Cage card

Cage cards can be printed by clicking on the respective links in the rack view (see 4.4.2) and cage view (see 4.4.3).



**Figure 15: Cage card.** Left part: in the top row, room (1001) and rack (01) are denoted on the left, the cage ID (0297) is printed on the right, whereas the color bar is centred. Mouse specific rows contain mouse ID, eartag, sex and date of birth in the first line. Strain (background) and line information are printed on the second line. Genotype information is given in the third line and comments on the fourth line. Right part: in the top row, the cage ID is barcoded. Mouse specific rows contain a barcode of the mouse ID together with sex, mouse ID and eartag. The origin of the mouse (M: mating/weaning; I: import) with the correspondent mating or import ID is given. IDs of father and mother are printed below.

## 4.5 Collecting and grouping mice – the cart

In MausDB, the so-called cart plays an important role for collecting and grouping mice. Most functions can be carried out via a three-step procedure, some functions even require it:

- first step: locate and identify a set of mice
- second step: select mice and put them into the cart
- third step: open the cart and apply a function on selected mice in the cart

Putting mice in a cart is like writing a mouse ID on a piece of paper. Being listed in the cart does not affect or change properties of that mouse in the database at all. Removing a mouse from the cart also does not affect or remove the mouse from the database.

The cart content (i.e. a set of mice) is bound to a browser session which means the user-specific cart is emptied after logout. However, the current cart can be permanently stored to the database. Thus, grouping of mice is made possible. No matter where mice are caged, no matter if mice died in the meantime, they stay in the cart.

The screenshot shows the MausDB DEMO homepage. At the top left, it says "Logged in as admin ([log out](#))". In the center, there's a logo of a mouse and the text "MausDB DEMO". At the top right, there are links for "Help", "View mouse", and a search bar. Below the header, it says "2 mice in cart ([empty cart](#))". A navigation menu at the bottom includes "Home", "racks&cages", "search&find", "import", "reports", and "settings".

Figure 16: The cart symbol indicates that there are two mice in the cart. Clicking on the cart symbol leads to the cart view.

The screenshot shows the "Your mouse 'shopping cart'" view. It displays a table of selected mice with columns: #, mouse ID, ear, sex, born, age, death, genotype, strain, line, room/rack / cage, and comment (shortened). Two rows are shown, both for mice with ID 50005136 and 50005137. Below the table are buttons for "Empty cart", "Remove selected from cart", and "Keep selected in cart". There are fields for "cart name" (set to "cart\_admin\_07.05.2007"), "public?", and checkboxes for "Save cart" and "Load cart", along with a "Export cart to Excel" button. At the bottom, there's a section for "What do you want to do with mice selected above?" with buttons for kill, mate, embryo transfer, genotype, add/change experiment, add/change cost centre, order phenotyping, view phenotyping data, append comment, upload and link file to selected mice, and a dropdown for "select random subset". The footer notes "Page generated on Mon May 7 17:44:26 2007".

Figure 17: The cart. All mice in the cart are displayed one per row. Mouse ID, room/rack and cage numbers are clickable and lead to the respective detail views. Cart management functions are available directly below the mouse table. Mouse specific functions are made available on the lower part .They are either self-explaining or explained in detail elsewhere in this manual.

## 4.6 All about a mouse - the “Mouse details” page

Since the mouse ID is the unique identifier of a mouse in MausDB, it is displayed as a clickable link almost everywhere. Clicking on the mouse ID will directly lead to the “mouse details” view.

**Mouse details**

Details for mouse 50003923 [\[edit details\]](#)

mouse ID	ear	sex	born	age	death	genotype	strain	line	generation	color	is GVO	room/rack-cage [cage history]
50003923	23	m	13.09.2006	237	-	y	-	HJ-B-B6	'F3'	n/d	y	1001/01-0096

**Experiment history:**

experimental status	Experiment	From	To
	234-A7	08.05.2007 10:56:08	<still in experiment>

**cost centre status** [\[help\]](#)

cost centre status	Cost centre	From	To
	MausDB_account_1	09.10.2006 09:00:00	<still assigned>

**phenotyping status**

no phenotyping orders for this mouse

**phenotyping data**

no phenotyping records for this mouse

**comments**

no comments for this mouse

[update comment](#)

---

Origin of mouse 50003923:

[1. litter from mating 335 \(show ancestors\)](#)

---

Breeding record for mouse 50003923 (all matings in which mouse 50003923 was/is parent)

Total progeny: 20

mating id	mating name	mating start	mating end	mating scheme	mating purpose	generation	project	litter number	comment
mating 372	-	07.11.2006	-	-	-	-	Projekt_1	6	

---

Genotype information for mouse 50003923

gene	genotype	genotyping date	genotyping method
hii	y	09.10.2006	unspecified

---

Properties/attributes for mouse 50003923

no properties/attributes for this mouse

---

Files available for mouse 50003923

no files stored for this mouse

[Add mouse to cart](#)

---

What do you want to do with this mouse?

[kill](#) [mate](#) [genotype](#) [add/change experiment](#) [add/change cost centre](#) [order phenotyping](#)

Figure 18: Mouse details view. On top of the box, the „edit details“ link leads to a dialog where some mouse specific details can be modified (see Figure 19). **Top box:** the top row contains individual mouse data. „GVO“ is the German acronym for „genetically modified organism“. On top of the room/rack/cage information, the „cage history“ link leads to a detailed cage history of the current individual mouse (see 4.7.1). Assignment to an experiment and cost centre assignment are given with time ranges. **Below box:** the origin information indicates whether a mouse originates from a weaning or from an import. For weaned mice, links to littermates („litter“, see 4.7.5), parents („mating“, see 4.7.4) and ancestors („show ancestors“, see 4.7.3) are given. For imported mice, a link to the respective import (see 0) is displayed. The „Breeding record“ table shows every mating, in which the current mouse is/was mating partner. The „Genotype information“ panel shows all genotype data for the current mouse. Properties (e.g. foreign IDs for imported mice) and attached files are listed if available.

By following the “edit details” link in the previous figure the following page is displayed:

Edit mouse details

Details for mouse [50005137](#)

mouse ID	50005137		
ear	current: 37 , new: 37	<input type="button" value="update earmark"/>	
sex	current: m , new: <input checked="" type="radio"/> m <input type="radio"/> f	<input type="button" value="update sex"/>	
color	current: n/d , new: <input type="button" value="n/d"/> <input type="button" value="dropdown"/>	<input type="button" value="update color"/>	
born	13.03.2007		
age	56		
death	-		
genotype	y		
strain	-		
line	HJ3-B-B6		
is GVO	y		
room/rack-cage	1001/01-0012		
comments	no comments for this mouse		
	<input type="button" value="update comment"/>		
pathoID	<input type="text"/>	<input type="button" value="insert or update pathoID"/>	(something like 06/123)

[back to mouse details](#)

Page generated on Tue May 8 10:20:09 2007

Figure 19: Edit mouse details. Some individual mouse properties (eartag, sex, color and comment) can be changed here. Other properties like for example date of birth not only affect an individual mouse, but a whole litter and therefore must be changed by a trained administrator on the SQL level.

## 4.7 Some more informational views ...

### 4.7.1 Cage history of a mouse

Sometimes it is not only important to know where a mouse is currently located, but also in which rack and cage a mouse was housed in the past together with which cage mates. This kind of detailed cage history can be viewed with MausDB easily:

Logged in as admin ([log out](#))

**MausDB DEMO**

0 mice in cart [Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#) [Help](#)

Cage history of mouse [50004217](#)

Mouse [50004217](#) was placed in the following cages:

in cage	from	to	together with	with cage being placed in rack
0225	29.11.2006 09:00:00	25.01.2007 16:35:10	<a href="#">50004216</a> , <a href="#">50004218</a>	1002-16 from: 29.11.2006 09:00:00 to: 17.01.2007 11:01:21 1002-15 from: 17.01.2007 11:01:21 to: 07.03.2007 10:01:59
0010	25.01.2007 16:35:10	(still there)	<a href="#">50004147</a> , <a href="#">50004517</a>	1002-13 from: 17.01.2007 10:44:04 to: 14.02.2007 13:50:55 1002-15 from: 14.02.2007 13:50:55 to: 22.03.2007 14:07:00 1002-16 from: 22.03.2007 14:07:00 to: (cage still there)

Page generated on Tue May 8 10:27:00 2007

Figure 20: Cage history of a mouse. The complete cage transfer history of a mouse is recorded and can be viewed for sanitary purposes, for example. The time range (from-to) of cage allocation is given in a row for every cage a mouse has been placed in the past up to present time. Cagemates of the current mouse are given for the respective cage and time in the fourth column. For every cage, the rightmost column lists the rack allocation during the respective time range.

## 4.7.2 Rack history of a cage

Sometimes it is interesting to know in which racks a cage was placed in the past. To be exact: to which racks a cage ID was assigned in the past, since cage IDs are being reused in MausDB and are not an attribute of a physical cage. Such a detailed rack history of a cage can be easily viewed with MausDB and is available by a link from the respective cage view (see 4.4.3).

Logged in as admin ([log out](#)) Help

**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Rack history of cage ID [0026](#)

Cage ID [0026](#) was assigned to the following racks:

in rack	from	to	cagemates
<a href="#">1002-15</a>	28.11.2005 12:00:00	08.03.2006 15:34:34	<a href="#">50000054</a> , <a href="#">50000055</a>
<a href="#">1002-12</a>	08.03.2006 15:35:10	05.04.2006 09:40:11	<a href="#">50000057</a>
<a href="#">1002-13</a>	05.04.2006 10:26:00	03.05.2006 15:08:03	<a href="#">50002626</a> , <a href="#">50002627</a> , <a href="#">50002628</a>
<a href="#">1002-15</a>	03.05.2006 15:08:03	08.05.2006 15:29:22	<a href="#">50002627</a>
<a href="#">1001-03</a>	29.05.2006 09:39:00	26.06.2006 09:31:16	<a href="#">50002845</a>
<a href="#">1001-03</a>	26.06.2006 09:41:58	13.11.2006 10:13:58	<a href="#">50002194</a> , <a href="#">50002884</a>
<a href="#">1002-11</a>	15.11.2006 09:00:00	10.01.2007 10:32:14	<a href="#">50004148</a> , <a href="#">50004149</a> , <a href="#">50004150</a> , <a href="#">50004151</a>
<a href="#">1002-11</a>	10.01.2007 11:10:47	(still there)	<a href="#">50004022</a> , <a href="#">50004245</a>

Page generated on Thu May 10 13:37:54 2007

Figure 21: Rack history of a cage. For a given cage ID, the table lists previous and current assignments to racks (column 1) with the relevant time range (columns 2-3).

## 4.7.3 Ancestor table

In order to trace back the ancestors of an individual mouse over generations, an ancestor tree is the most convenient way to do so. MausDB uses an ancestor table to show parents of mice together with genotype information (see Fig. 22). In case of very wide ancestor trees a link (more) is given which can be followed to use the particular mouse as the root of a new ancestor tree.

Ancestors of mouse 50003923	
male: <a href="#">50003923</a> y (hij)	father: <a href="#">50003102</a> y (hij)
	father: <a href="#">50000790</a> y (hij)
	mother: <a href="#">50000792</a> y (hij)
	father: <a href="#">50000781</a> y (hij)
	mother: <a href="#">50000782</a> y (hij)
	father: <a href="#">50000781</a> y (hij)
	mother: <a href="#">50000782</a> y (hij)
	father: <a href="#">50000781</a> y (hij)
	mother: <a href="#">50000782</a> y (hij)
	father: <a href="#">50000781</a> y (hij)
	mother: <a href="#">50000782</a> y (hij)

Figure 22: Ancestor table. The mouse for which the ancestor table was called is displayed on the left. Next to it on the right side, father and mother ID along with genotype information are shown and so on.

#### 4.7.4 Mating details view

In the mating details view, mating partners and litters of a defined mating are shown in an overview. How to set up a mating in MausDB is described step by step in chapter 5.1.

Logged in as admin ([log out](#))
MausDB DEMO
[Help](#)

0 mice in cart
[View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Mating details

[previous](#)
[next](#)

---

**Parents of mating 335**

#	role	entered mating	left mating	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage	parental status
1	father	21.08.2006	07.11.2006	50003102	02	m	03.06.2006	157	07.11.2006	y	-	HD-B-B6	-	removed
2	mother	21.08.2006	07.11.2006	50003106	06	f	03.06.2006	170	20.11.2006	y	-	HIJ-B-B6	-	removed

---

Litters from mating 335
[report new litter](#)

#	born	weaned	# weaned or # alive	# reduced	comment
1. litter	13.09.2006	09.10.2006	8	0	
2. litter	03.11.2006	07.11.2006	0	0	

---

**Details for mating mating 335**

Mating type	normal mating
Mating name	-
Mating start	21.08.2006
Mating end	07.11.2006 10:03:22
Strain	-
Line	HIJ-B-B6
Mating scheme	-
Mating purpose	-
Mating generation	'F3'
assigned project	Projekt_1
mating comment	

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Figure 23: Mating details. The top table contains the mating partners, i.e. the parents. The second table shows all litters produced in the course of the mating so far. Clicking on the litter link in the leftmost column leads to the litter view (see 4.7.5). Additional litters can be reported by clicking on the „report new litter“ button. The bottom table shows mating details, for example mating start, mating end, line offspring line, comment.

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## 4.7.5 Litter view

In the litter view, parents and littermates of an individual litter are shown together with litter details, for example date of birth, date of weaning, and comment.

Logged in as admin ([log out](#))      **MausDB DEMO**      [Help](#)

0 mice in cart      [Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

**Litter details**

**1. Litter from [mating 335](#) : weaning overview**

birth date	weaning date	alive			dead			reduced	
		total	male	female	total	male	female	total	why
13.09.2006	09.10.2006	9	4	5	0	0	0	-	
<b>comment</b>									
<a href="#">update litter comment</a>									

---

**1. litter from [mating 335](#) : parents**

#	<input type="checkbox"/>	role	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage
1	<input type="checkbox"/>	father	50003102	02	m	03.06.2006	157	07.11.2006	y	-	HIJ-B-B6	-
2	<input type="checkbox"/>	mother	50003106	06	f	03.06.2006	170	20.11.2006	y	-	HIJ-B-B6	-

[Add selected mice to cart](#)

---

**1. Litter from [mating 335](#) : littermates**

#	<input type="checkbox"/>	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage
1	<input type="checkbox"/>	50003923 +	23	m	13.09.2006	237	-	y	-	HIJ-B-B6	1001/01-0096
2	<input type="checkbox"/>	50003924 +	24	m	13.09.2006	173	05.03.2007	y	-	HIJ-B-B6	-
3	<input type="checkbox"/>	50003925	25	m	13.09.2006	131	22.01.2007	y	-	HIJ-B-B6	-
4	<input type="checkbox"/>	50003926	26	m	13.09.2006	131	22.01.2007	y	-	HIJ-B-B6	-
5	<input type="checkbox"/>	50003927 +	27	f	13.09.2006	237	-	y	-	HIJ-B-B6	1001/01-0096
6	<input type="checkbox"/>	50003928	28	f	13.09.2006	237	-	y	-	HIJ-B-B6	1001/01-0174
7	<input type="checkbox"/>	50003929	29	f	13.09.2006	237	-	y	-	HIJ-B-B6	1001/01-0174
8	<input type="checkbox"/>	50003930 +	30	f	13.09.2006	237	-	y	-	HIJ-B-B6	1001/01-0005

(+ means that this mouse was/is used as parent in a mating)

[Add selected mice to cart](#)

---

**What do you want to do with mice selected above?**

[kill](#) [mate](#) [genotype](#) [add/change experiment](#) [add/change cost centre](#) [order phenotyping](#)

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**Figure 24: Litter view.** The top box shows litter details, for example date of birth, date of weaning, and comment. The parents table shows parent mice of the current litter. The bottom table lists all littermates of the current mating. '+' after mouse ID indicates that a mouse has been partner in a mating itself. Parents as well as littermates can be selected and either put in the cart or used for actions that are made available by function buttons on the very bottom.

## 4.7.6 Import view

As every import defines an individual batch of mice, the import view shows all information about an import. How to set up an import in MausDB is described step by step in chapter 5.5.

Logged in as admin ([log out](#))
MausDB DEMO
[Help](#)

0 mice in cart
[View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Import details
[previous](#)
[next](#)

**Import 57 details**

Import number	57
Import name	""
Strain	-
Line	C3HeB/FeJ
Project	Projekt_1
Import type	regular
Date of import	06.12.2006
Import purpose	purpose
Owner	no owners defined
Provider name	Charles River
Provider	-
Import by	monika
Healthreports	no health report available
Import comment	
no import comment	
<a href="#">update import comment</a>	

---

Mice/mouse from this import

#	<input type="checkbox"/>	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage
1	<input type="checkbox"/>	50004249	21	f	19.09.2006	93	21.12.2006		-	C3HeB/FeJ	-
2	<input type="checkbox"/>	50004250	22	f	19.09.2006	174	12.03.2007		-	C3HeB/FeJ	-
3	<input type="checkbox"/>	50004251	23	f	19.09.2006	92	20.12.2006		-	C3HeB/FeJ	-
4	<input type="checkbox"/>	50004252	24	f	19.09.2006	93	21.12.2006		-	C3HeB/FeJ	-
5	<input type="checkbox"/>	50004253	25	f	19.09.2006	174	12.03.2007		-	C3HeB/FeJ	-

**What do you want to do with mice selected above?**

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**Figure 25: Import details.** The top box shows import specific information. The table lists all mice that belong to this import. Mice can be selected and either put in the cart or used for actions that are made available by function buttons on the very bottom.

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## 4.8 Finding mice by properties – the “search&find” page

In order to find mice not by their location (i.e. rack and cage browsing), but based on other properties, the search&find functions of MausDB can be used.

The screenshot shows the "Search & find" page with the following sections:

- Browse ...** links to [browse matings](#) and [browse imports](#).
- Find mice ... [Optional:  restrict search to cart]**

  - ... by mouse ID(s)** and **... by cage ID(s)** input fields with "Search by mouse IDs" and "Search cage(s)" buttons.
  - ... by date of birth** and **... by date of death** input fields with "Birth after" and "Death after" dropdowns set to "01.01.2006", and "Birth before" and "Death before" dropdowns set to "01.02.2006". Buttons for "Search by date of birth" and "Search by date of death" are present.
  - ... by line, sex, age and genotype** section with "from line: ABC-129", "sex: male or female", "age from: no min age" to "no max age", and "genotype: any". Buttons for "Search by line and sex" and "Search by genotype" are available.
  - ... by genotype** section with three dropdowns for "1. genotype: abc", "2. genotype: abc", and "3. genotype: abc", each with "n/a" and a dropdown button. A "Search by genotype" button is present.
  - include dead:**
  - only dead:**
  - Search by line and sex** button.

- ... by mouse comment** and **... by experiment** input fields with "Search by comment" and "Search by experiment" buttons.
- ... by patho ID(s)** and **... by foreign ID** input fields with "Search by patho ID" and "Search by foreign ID" buttons.
- ... by strain** section with "strain: .", "include dead: ", and "Search by strain" button.
- Find ...**

  - ... mating by ID** and **... mating(s) by name** input fields with "Search by mating ID" and "Search by mating name" buttons.
  - ... mating(s) by project** and **... matings by line** input fields with "Projekt\_1" and "ABC-129" dropdowns, and "Search by mating project" and "Search by mating line" buttons.
  - ... litter by ID** and **... import by ID** input fields with "Search by litter ID" and "Search by import ID" buttons.
  - ... orderlist by ID** and **... orderlists by parameterset** input fields with "Search by orderlist ID" and "Search orderlists by parameterset" buttons. The "parameterset" dropdown has "Kill" and "done" options.
  - ... cart by cart name** and **... file(s) by keyword** input fields with "Search by cart name" and "Search files by keyword" buttons.

Figure 26: Search&Find page. **Top section:** Clicking „browse matings“ leads to a mating overview (see 4.8.1), clicking „browse imports“ leads to an import overview (see 4.8.2). **Middle section:** Mice can be searched for by different criteria. The result set will always be a list of mice. Optionally, searches in this section can be restricted to mice currently in the cart, which allows concatenation of different searches. The input fields „... by mouse ID(s)“ and „... by cage ID(s)“ accept any input, for example a whole spreadsheet column copied via the clipboard. IDs contained in this input will be recognized automatically. **Bottom section:** Other entities than mice can be searched in this section, for example matings, imports, carts, and others. Searches in this section cannot be restricted to the cart. Input fields for name or comment searches accept multiple terms that are combined by logical AND.

## 4.8.1 Mating overview

All matings ever set up in MausDB can be listed in the mating overview.

Mating overview													
#	mating id	mating name	mating start	mating end	strain	line	mating scheme	mating purpose	generation	project	litter number	comment	
1	<a href="#">mating 492</a>	-	28.03.2007	-	-	ABC-C3H	-	-	-	Projekt_2	0		
2	<a href="#">mating 491</a>	-	28.03.2007	-	-	ABC-C3H	-	-	-	Projekt_2	0		
3	<a href="#">mating 490</a>	-	26.03.2007	26.03.2007	-	ABC-FLP-CON	-	-	'F5'	Projekt_2	0		
4	<a href="#">mating 489</a>	-	26.03.2007	-	-	ABC-FLP-CON	-	-	'F5'	Projekt_2	0		
5	<a href="#">mating 488</a>	-	26.03.2007	-	-	ABC-FLP-CON	-	-	'F4'	Projekt_2	0		
6	<a href="#">mating 487</a>	-	26.03.2007	-	C57BL/6J-BTNT	KLM-KO	-	-	-	Projekt_2	0		
7	<a href="#">mating 486</a>	-	26.03.2007	-	C57BL/6J-BTNT	KLM-KO	-	-	'F1'	Projekt_2	0		
8	<a href="#">mating 485</a>	-	26.03.2007	-	C57BL/6J-BTNT	KLM-KO	-	-	'F1'	Projekt_2	0		
9	<a href="#">mating 484</a>	-	23.03.2007	-	-	ABC-FLP-CON	-	-	'F6'	Projekt_2	0		
10	<a href="#">mating 483</a>	-	23.03.2007	-	-	ABC-FLP-CON	-	-	'F6'	Projekt_2	0		
11	<a href="#">mating 482</a>	-	23.03.2007	-	-	ABC-FLP-CON	-	-	'F6'	Projekt_2	0		
12	<a href="#">mating 481</a>	-	23.03.2007	-	-	ABC-FLP-CON	-	-	'F6'	Projekt_2	0		
13	<a href="#">mating 480</a>	-	23.03.2007	-	-	ABC-FLP-CON	-	-	'F4'	Projekt_2	0		
14	<a href="#">mating 479</a>	-	23.03.2007	-	-	ABC-FLP-CON	-	-	'F4'	Projekt_2	0		
15	<a href="#">mating 478</a>	-	23.03.2007	-	-	ABC-FLP-CON	-	-	'F5'	Projekt_2	0		
16	<a href="#">mating 477</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F6'	Projekt_2	0		
17	<a href="#">mating 476</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F5'	Projekt_2	0		
18	<a href="#">mating 475</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F6'	Projekt_2	0		
19	<a href="#">mating 474</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F6'	Projekt_2	0		
20	<a href="#">mating 473</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F6'	Projekt_2	0		
21	<a href="#">mating 472</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F6'	Projekt_2	0		
22	<a href="#">mating 471</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F5'	Projekt_2	0		
23	<a href="#">mating 470</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F5'	Projekt_2	0		
24	<a href="#">mating 469</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F6'	Projekt_2	0		
25	<a href="#">mating 468</a>	-	23.03.2007	-	-	ABC-B-CON	-	-	'F6'	Projekt_2	0		

Figure 27: Mating overview. All matings are shown by default and multiple result pages can be browsed using the „first“ (= most recent), „previous“, „next“, and „last“ links. Matings can be filtered to show „only active matings“, which means matings for which no end date is defined. Clickable mating IDs lead to the detailed mating view of the individual mating.

## 4.8.2 Import overview

All imports ever defined in MausDB can be listed in the import overview.

Import overview													
#	Import number	Import name	Mice #	Strain	Line	Import type	Date of import	Provider	Provider	Origin	Internal	Import by	Import comment (shortened)
1	<a href="#">import 59</a>	"	4	-	NOT1-GA	regular	12.03.2007	Charles River	-			monika	no import comment
2	<a href="#">import 58</a>	"	5	-	Foster	regular	29.01.2007	Charles River	-			monika	no import comment
3	<a href="#">import 57</a>	"	5	-	C3HeB/FeJ	regular	06.12.2006	Charles River	-			monika	no import comment
4	<a href="#">import 56</a>	"	6	-	C57BL/6J	regular	18.10.2006	Charles River	-			monika	no import comment
5	<a href="#">import 55</a>	"	9	-	ABC-G640C	regular	08.08.2006	Charles River	-			monika	no import comment
6	<a href="#">import 54</a>	"	6	-	C57BL/6J	regular	31.07.2006	Charles River	-			monika	no import comment
7	<a href="#">import 53</a>	"	2	-	Foster	regular	28.02.2006	Charles River	-			monika	no import comment
8	<a href="#">import 52</a>	"	2	-	ABC-FLP-CON	regular	13.03.2006	Charles River	-			monika	no import comment
9	<a href="#">import 51</a>	"	6	-	ABC-C3H	regular	07.03.2006	Charles River	-			admin	no import comment
10	<a href="#">import 50</a>	"	2	-	ABC-129	regular	30.08.2005	Charles River	-			admin	no import comment
11	<a href="#">import 49</a>	"	1	-	ABC-129	regular	20.12.2005	Charles River	-			admin	no import comment
12	<a href="#">import 48</a>	"	2	-	C57BL/6J	regular	15.02.2006	Charles River	-			monika	no import comment
13	<a href="#">import 47</a>	"	2	-	C57BL/6J	regular	02.08.2005	Charles River	-			monika	no import comment
14	<a href="#">import 46</a>	"	2	-	HJ-B-B6	regular	01.10.2005	Charles River	-			admin	no import comment
15	<a href="#">import 45</a>	"	2	-	FLP-B6	regular	05.01.2006	Charles River	-			admin	no import comment
16	<a href="#">import 44</a>	"	27	-	C57BL/6J	regular	15.03.2005	Charles River	-			admin	no import comment
17	<a href="#">import 43</a>	"	2	-	ABC-CON	regular	15.03.2005	Charles River	-			admin	no import comment
18	<a href="#">import 42</a>	"	2	-	C57BL/6J	regular	14.01.2005	Charles River	-			admin	no import comment
19	<a href="#">import 41</a>	"	1	-	HJ-C-B6	regular	14.02.2005	Charles River	-			admin	no import comment
20	<a href="#">import 40</a>	"	6	-	ABE-C3H	regular	01.02.2005	Charles River	-			admin	no import comment
21	<a href="#">import 39</a>	"	3	-	HJ-B-B6	regular	14.06.2005	Charles River	-			admin	no import comment
22	<a href="#">import 38</a>	"	4	-	C3HeB/FeJ	regular	01.04.2005	Charles River	-			admin	no import comment
23	<a href="#">import 37</a>	"	3	-	GHI-B6	regular	04.12.2005	Charles River	-			admin	no import comment
24	<a href="#">import 36</a>	"	8	-	C57BL/6J	regular	01.07.2005	Charles River	-			admin	no import comment
25	<a href="#">import 35</a>	"	2	-	HJ-A-B6	regular	01.02.2006	Charles River	-			admin	no import comment

Figure 28: Import overview. All imports are shown. Multiple result pages can be browsed using the „first“, „previous“, „next“, and „last“ links. Clickable import IDs lead to the detailed import view of the individual import.

## 4.9 Managing your phenotyping data – Parametersets

Phenotyping data is organized in pre-definable “**Parameters**” within MausDB. Sets of parameters that result from an assay can be grouped/organized in so-called “**Parametersets**”. These can be viewed and defined via the user interface (*reports → parameters, reports → parametersets*).

Example parameters and parametersets can be generated using the script “parametersets.sql” that is part of the download repository (\\" means: into same line):

```
# mysql -u <user> -p<password> mausdb      <      \\  
/home/admin/mausdb/SQL/setup_database/parameters.sql
```

Parametersets overview [create new parameterset ]						
#	parameterset	description	screen/project	class	is active	# records
1	<a href="#">example_set</a>	example parameterset	GMCI	1	y	0
2	<a href="#">mate</a>	mate	GMCI	4	y	800

Page generated on Tue Mar 30 16:56:08 2010

Figure 29: Parametersets overview. Two example parametersets are shown.

Parameterset overview: "example_set" [overall min, mean, max ]											
1) Excel upload configuration											
mouse ID column	(you may update this column)	A									
date(time) column	(you may update this column)	B									
2) Metadata definitions parameter set "example_set"											
No metadata definitions found for this parameter set											
<a href="#">add metadata definition</a>											
3) Parameters belonging to parameter set "example_set"											
<a href="#">parameterset settings updated!</a>											
remove	name	short name	description	unit	metadata?	type	category	default value	normal range	increment	increment unit
remove	<a href="#">bodylength</a>	bodylength	body length of a mouse	mm	n	integer	simple	100			
remove	<a href="#">bodymass</a>	bodymass	body mass of a mouse	g	n	float	simple	25			
<a href="#">Excel upload</a>											
Excel column											
	C		length								
	D		mass								

Figure 30: Parameterset overview. Two parameters are defined, columns for Excel upload interface are set up and can be configured via the web user interface.

## 4.10 Scheduling phenotyping assays and common tasks

In MausDB, routine common tasks (mate, wean, ship mice, sperm freeze) as well as phenotyping assays can be scheduled by scientists or a core team using the so-called “**orderlists**”.

An orderlist basically is a list of mice scheduled for a particular task (formally called a “parameterset”) with a particular due date.

A so-called “**workflow**” is a series of “**parametersets**” (tasks) ordered in a given temporal order. This way, standard multi-step routines like primary phenotyping or cryo-preservation workflows can be assigned to groups of mice in one step resulting in a number of orderlists. Worklists currently have to be defined on SQL level. Example scripts are available in the download repository.

**Orderlist view**

**Orderlist information [print orderlist]**

orderlist ID	9616
name	wildtype_Sperm-freeze_2009-11-23_rey
created by	rey
created at	23.11.2009 07:09:04
job	measure
scheduled for	scheduled: 23.11.2009 (week 48/2009)
change to:	- <input checked="" type="checkbox"/> change schedule date
assigned to	rey
parameter set	Sperm-freeze
status	done <input type="button" value="set on ordered"/>
comment	no comments for this orderlist  <input type="button" value="update comment"/>
Do you really want to delete all medical records uploaded for this orderlist? <input type="checkbox"/> yes, I want to delete all medical records from this orderlist <input type="checkbox"/> delete uploaded data from this orderlist	

**Parameterset-specific metadata**

No parameterset-specific metadata stored or even defined!

**Mice on orderlist**

There are 9 mice on this orderlist

#	<input type="checkbox"/> mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack / cage	comment (shortened)	pathoID	view records [ <a href="#">status</a> ]	status	edit status [ <a href="#">status codes</a> ] <input type="button" value="update status"/>
1	<input type="checkbox"/> 30122850	24	m	24.06.2009	152	23.11.2009	het	C57BL/6NTac	EPD0028_5_G01	-			none yet	undefined	<input checked="" type="checkbox"/>
2	<input type="checkbox"/> 30129288	54	m	25.08.2009	90	23.11.2009		C57BL/6J	wildtype	-			none yet	undefined	<input checked="" type="checkbox"/>
3	<input type="checkbox"/> 30129289	55	m	25.08.2009	90	23.11.2009		C57BL/6J	wildtype	-			none yet	undefined	<input checked="" type="checkbox"/>
4	<input type="checkbox"/> 30129292	58	m	25.08.2009	90	23.11.2009		C57BL/6J	wildtype	-			none yet	undefined	<input checked="" type="checkbox"/>
5	<input type="checkbox"/> 30129293	59	m	25.08.2009	90	23.11.2009		C57BL/6J	wildtype	-			none yet	undefined	<input checked="" type="checkbox"/>
6	<input type="checkbox"/> 30130082	65	m	21.08.2009	84	23.11.2009		C57BL/6J	wildtype	-			none yet	undefined	<input checked="" type="checkbox"/>

Figure 31: Orderlist view. A list of 9 mice is scheduled for sperm freezing for a specific date.

In order to generate an orderlist or a series of orderlists, start from the cart, select your mice and choose **order phenotyping**.

In the next step, either choose a user-defined workflow or a previous defined workflow.

**Order phenotyping: 1. step**

Please specify phenotyping workflow

Workflow	User-defined
Calendar week (of first phenotyping task)	13/2010

mouse id	ear	sex
30122850	24	m
30129288	54	m
30129289	55	m
30129292	58	m
30129293	59	m
30130082	65	m
30130091	74	m
30130095	78	m
30130101	84	m

Figure 32: Order phenotyping, 1. step. Choose a workflow for selected mice

In the next step, specify tasks/parametersets and their corresponding due dates. Finally, confirm your order which will result in the generation of orderlists. The orderlists will be displayed on the “**Home**” page of MausDB.

## 4.11 Loading phenotype data into MausDB

Parametric phenotype data can be uploaded into MausDB using Excel sheets. For every parameterset, columns can be defined interactively via the web interface (see above). Once defined, data can be uploaded from Excel files starting from a specific orderlist (select mice

from orderlist, then press button “**upload data for mice from this list**”). In the next step, the file has to be located on your file system and the the sheet can be chosen.

Upon upload, mouse ids from the orderlist and from the specified column in the Excel file are matched. An example Excel file (**home/admin/mausdb/info/example.xls**) is available in the download repository. In order to be able to use this example, mice with corresponding mouse ids must exist in the database and be part of an “example set” orderlist. You may also adjust mouse ids and dates (of measurement) in the Excel file (columns A and B).

Upload phenotyping data: 2. step

Trying to upload Excel file ...  
... file "example.xls" successfully uploaded.  
Using sheet "Sheet1" of uploaded file "example.xls"  
Please use the checkboxes to select or de-select rows (mice) and/or columns (values) for data entry:

select	mouse_id	measure_date	length [mm]	mass [g]
<input checked="" type="checkbox"/>	10000001	24.10.2009	95	24.7
<input checked="" type="checkbox"/>	10000002	24.10.2009	98	25.3
<input checked="" type="checkbox"/>	10000003	24.10.2009	91	22.7
<input checked="" type="checkbox"/>	10000004	24.10.2009	92	21.8
<input checked="" type="checkbox"/>	10000005	24.10.2009	87	20.3
<input checked="" type="checkbox"/>	10000006	24.10.2009	107	27.0
<input checked="" type="checkbox"/>	10000007	24.10.2009	93	24.8
<input checked="" type="checkbox"/>	10000008	24.10.2009	94	23.8
<input checked="" type="checkbox"/>	10000009	24.10.2009	97	22.7

0 errors

Please provide some additional data:

project, to which data belongs	Primary Screen	is data public?	<input checked="" type="radio"/> yes <input type="radio"/> no
user (responsible)	maier (Holger Maier)		
user (measured)	maier (Holger Maier)		

[upload!](#) or [go back](#)

Figure 33: Uploading phenotype data. Data is matched via mouse id columns in orderlist and Excel file.

## 4.12 Statistics and visualisation of phenotyping data using the R interface

Phenotyping data stored in MausDB can be visualised and statically analysed using the custom R interface of MausDB. Three steps are necessary and are shown on an example (\\" means: into same line):

### a) a specific SQL script needs to be located in /var/www/mausdb/R

```
# sudo cp /home/admin/mausdb/code/var/www/mausdb/R/example.sql    \\
/var/www/mausdb/R
```

### b) a specific R script also needs to be located in /var/www/mausdb/R

```
# sudo cp /home/admin/mausdb/code/var/www/mausdb/R/example.r    \\
/var/www/mausdb/R
```

### c) the two scripts need to be “known” by MausDB (\\" means: into same line):

```
# mysql -u <user> -p<password> mausdb      <           \\
/home/admin/mausdb/SQL/insert/add_settings_R_scripts.sql
```

The entry made here must be the prefix name of the two scripts. In this example, “example.r” and “example.sql” require adding “example” to table settings.

Please study the example.r and example.sql for further explanations how the system is working.

In order to run the script, go to the orderlist and press the button “**apply R script**”.

---

#### Run R script "example" on a selection of 9 mice

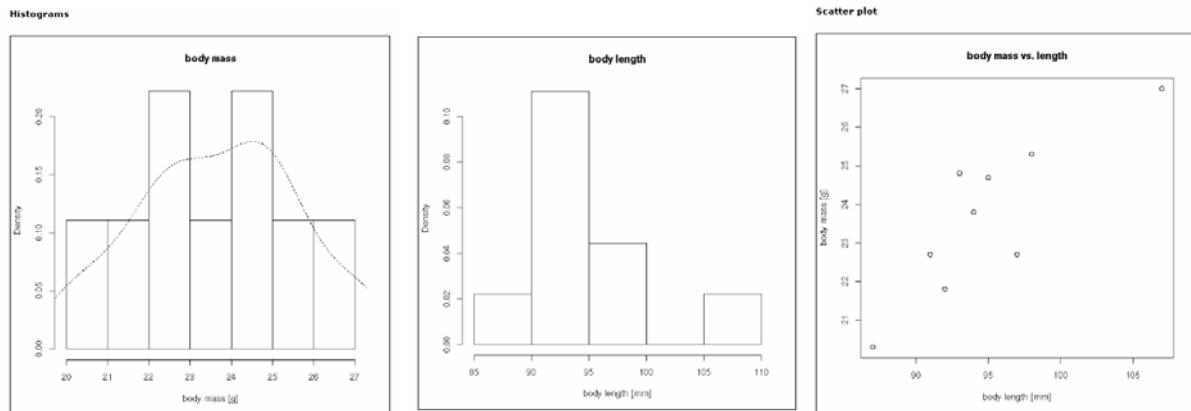
---

```
Checking input
Setting up R environment
Reading SQL file [download: example.sql ]
Query database
Write data file [download as TAB delimited file: example\_data.txt ]
Running R script [download file: example.R ]
Download result file: example\_out.txt
```

---

#### 1. Example data for a selection of 9 animals

mouse_id	line	sex	mass	length
30130095	wildtype	m	23.8	94
30129292	wildtype	m	21.8	92
30130091	wildtype	m	24.8	93
30129289	wildtype	m	22.7	91
30130082	wildtype	m	27	107
30129288	wildtype	m	25.3	98
30130101	wildtype	m	22.7	97
30129293	wildtype	m	20.3	87
30122850	EPD0028_5_G01	m	24.7	95



**Figure 34: Example of phenotype data visualisation using R scripts via the MausDB web interface. Please note: data has been generated randomly and must not make sense at all.**

## 4.13 Overviews and reports – the “reports” page

### 4.13.1 Mouse lines overview

In order to get an overview about all mouse lines in MausDB, choose **reports → line overview**.

Mouse lines overview					
28 mouse lines found					
Browse pages: [first] [previous] [next] [last]					
(click on numbers to generate Excel report)					
#	line name (short)	line name (long)	alive males	females	total
1	<a href="#">ABC-129</a>	ABC-129	24	31	55
2	<a href="#">ABC-A-CON</a>	ABC-A-CON	0	0	0
3	<a href="#">ABC-B-CON</a>	ABC-B-CON	26	23	49
4	<a href="#">ABC-C-CON</a>	ABC-C-CON	0	0	0
5	<a href="#">ABC-C3H</a>	ABC-C3H	34	42	76
6	<a href="#">ABC-CON</a>	ABC-CON	0	0	0
7	<a href="#">ABC-FLP-CON</a>	ABC-FLP-CON	41	39	80
8	<a href="#">ABC-G640C</a>	ABC-G640C	36	50	86
9	<a href="#">ABC-G640CxABC-C3H</a>	ABC-G640CxABC-C3H	0	0	0
10	<a href="#">ABCxBCD-129</a>	ABCxBCD-129	0	0	0
11	<a href="#">ABE-C3H</a>	ABE-C3H	22	35	57
12	<a href="#">BCDxABC-129</a>	BCDxABC-129	0	0	0
13	<a href="#">C3HeB/FeJ</a>	C3HeB/FeJ	23	25	48
14	<a href="#">C57BL/6J</a>	C57BL/6J	9	18	27
15	<a href="#">FLP-B6</a>	FLP-B6	8	10	18
16	<a href="#">Foster</a>	Foster	0	0	0
17	<a href="#">GHI-B</a>	GHI-B	0	0	0
18	<a href="#">GHI-B6</a>	GHI-B6	47	31	78
19	<a href="#">HIJ-A-B6</a>	HIJ-A-B6	10	13	23
20	<a href="#">HIJ-B-B6</a>	HIJ-B-B6	17	23	40
21	<a href="#">HIJ-C-B6</a>	HIJ-C-B6	5	0	5
22	<a href="#">HIJ-DEF-ABC-129</a>	HIJ-DEF-ABC-129	45	51	96
23	<a href="#">HIJ-DEF-B6</a>	HIJ-DEF-B6	0	0	0
24	<a href="#">KLM-CKO</a>	KLM-CKO	0	0	0
25	<a href="#">KLM-KO</a>	KLM-KO	5	2	7

Figure 35: Mouse lines overview. All mouse lines are listed alphabetically. Multiple result pages can be browsed using the navigation links on top of the table. Clickable line names lead to line specific detail views. Clickable numbers show current live stock of male, female or total mice per line.

### 4.13.2 Mouse strains (genetic backgrounds) overview

In order to get an overview about all mouse strains (genetic backgrounds) in MausDB, choose **reports → strain overview**.

Mouse strains overview					
4 mouse strains found					
(click on numbers to generate Excel report)					
#	strain name	alive males	females	total	
1	<a href="#">-</a>	349	393	742	
2	<a href="#">BTNT</a>	5	2	7	
3	<a href="#">C57BL/6J</a>	6	5	11	
4	<a href="#">C57BL/6J-BTNT</a>	0	0	0	
total living mice (all strains)		360	400	760	

Figure 36: Mouse strains overview. Multiple result pages can be browsed using the navigation links on top of the table. Clickable strain names lead to strain specific detail views.

#### 4.13.3 [Specific to Helmholtz Zentrum München<sup>6</sup>: TEP report]

TEP is the German acronym for an animal registration program. The TEP system was developed on behalf of the Helmholtz Zentrum München and is now licensed for use by Ascenion ([www.ascenion.de](http://www.ascenion.de)) for the quantitative registration of laboratory animals of different species in an animal facility. The TEP report module in MausDB provides an export of statistical information that can be used for import into the Helmholtz Zentrum München TEP system.

The TEP report function produces a file in spreadsheet format (.xls). It contains a matrix with columns representing different reasons for assigning a MausDB mouse ID (import/weaning), death reasons or different states a mouse can have (breeding or experiment). In the rows the numbers of animals are listed which belong to the corresponding category grouped by a calendar week and TEP key (genetically modified yes/no, breeding or experimental name).

TEP report

---

Generate a TEP report ...

Please choose the report period

From  to

A TEP Excel file will be produced upon pressing the button. You can download the file to your local system or open it directly.

---

Page generated on Wed May 9 10:55:02 2007

Figure 37: TEP report. The report time period must be selected on calendar week level. An Excel file will be produced which can be imported into the Helmholtz Zentrum München TEP system.

#### 4.13.4 [Specific to Helmholtz Zentrum München: Versuchstiermeldung]

The “Versuchstiermeldung” (German expression for laboratory animal report) produces another set of statistical information. For all months of a given year, the number of animals which were newly assigned to a given experiment is calculated.

Versuchstiermeldung (monthly)

---

Generate a "Versuchstiermeldung" ...

(number of mice that started into experiment each month)

Choose experiment:

Choose year:

---

Page generated on Wed May 9 10:56:15 2007

Figure 38: Versuchstiermeldung. For a given year, the number of animals used every month in the course of a given experiment is calculated.

---

<sup>6</sup> Helmholtz Zentrum München, German Research Center for Environmental Health, Ingolstädter Landstr. 1, D-85764 Neuherberg, Germany

#### 4.13.5 Snapshot tail count

The number of animals housed in a given area at a given point in time can be determined using the “snapshot tail count” function.

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0 mice in cart [View mouse](#)

---

**Snapshot tail count**

---

**Calculate animal numbers for any point in time**

Please define point in time:  [Calendar icon](#)

Please specify area:  [Dropdown arrow](#)

[generate animal numbers](#)

---

Page generated on Wed May 9 10:57:07 2007

Figure 39: Snapshot tail count. A point in time and an area can be chosen. The number of animals will be calculated within a few seconds.

#### 4.13.6 Cage occupation

The number of “mouse days” in a given time period and area can be determined using the “cage occupation” function. One “mouse day” is the equivalent of one mouse being housed one day and can be used for cost billing purposes, for example.

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0 mice in cart [View mouse](#)

---

**Animal cage occupation**

---

**Calculate animal cage occupation for a time range**

Please define a start date:  [Calendar icon](#)

Please define an end date:  [Calendar icon](#)

Please specify area:  [Dropdown arrow](#)

[generate animal cage occupation](#)

---

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Figure 40: Cage occupation. A time period and an area can be chosen. The number of „mouse days“ will be calculated within short time.

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([log out](#))

## MausDB DEMO

[Help](#)



0 mice in cart

  
[View mouse](#)

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### Animal cage occupation in area: "Floor\_A"

Total number of mouse days from " 01.04.2007 " to " 30.04.2007 " in area: "Floor\_A"

Cost centre: MausDB\_account\_1

Experiment	GVO	non-GVO	sum (GVO + non-GVO)
breeding	16214	6540	22754
total	16214	6540	22754

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**Figure 41:** Result of cage occupation calculation. For a given time period and area, „mouse days“ are calculated. Numbers are calculated separately for genetically modified (GVO) and genetically non-modified mice (non-GVO).

## 5 Detailed step-by-step instructions for common tasks

### 5.1 How to set up a mating

The origin concept of mice in MausDB strictly requires a mating to happen before offspring can be weaned. It is important to stress that in MausDB, a mating is defined on an abstract level as the possibility that one male mouse and at least one female mouse can mate and produce offspring. As soon as such a mating is defined, litter can be reported and weaned. Litter reporting is a precondition for weaning.

**Important:** The mating is not at all coupled to co-caging (during a mating the mating partners do not necessarily have to be housed in the same cage), i.e. there is no automatic mating, when males and females are moved into the same cage. On the other hand, once a mating is defined, it will not be stopped automatically upon separation of the animals.

#### 5.1.1 Step 1: Defining mating partners

In order to define the mating partners (one male, one or more females), these must be selected first either in the rack view (see 4.4.2) or after having collected them in the cart (see 4.5).

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Rack details

Overview: rack 04 in room 35-Floor\_A-1001

Cages			total number of mice in this rack	project assignment	info
total capacity	in use/free	cages in use (*) and free cages (.)			
40	2 / 38	**.....	6	Projekt_1	

Cages currently in this rack

- (collapse all)

Cage #	<input type="checkbox"/> click for details	cage info							move	print	comment (shortened)	
		mouse ID	ear	sex	born	age	genotype	strain				line
<b>- 0156</b> 3 males, strain: -, line: HIJ-B-B6										<a href="#">cage</a>	<a href="#">print card</a>	
1	<input checked="" type="checkbox"/>	<a href="#">50005140</a>	40	m	15.03.2007	56	y	-	HIJ-B-B6	<a href="#">mouse</a>		
2	<input type="checkbox"/>	<a href="#">50005141</a>	41	m	15.03.2007	56	y	-	HIJ-B-B6	<a href="#">mouse</a>		
3	<input type="checkbox"/>	<a href="#">50005142</a>	42	m	15.03.2007	56	y	-	HIJ-B-B6	<a href="#">mouse</a>		
<b>- 0225</b> 3 females, strain: -, line: HIJ-B-B6										<a href="#">cage</a>	<a href="#">print card</a>	
1	<input checked="" type="checkbox"/>	<a href="#">50005146</a>	46	f	15.03.2007	56	y	-	HIJ-B-B6	<a href="#">mouse</a>		
2	<input type="checkbox"/>	<a href="#">50005147</a>	47	f	15.03.2007	56	y	-	HIJ-B-B6	<a href="#">mouse</a>		
3	<input type="checkbox"/>	<a href="#">50005148</a>	48	f	15.03.2007	56	y	-	HIJ-B-B6	<a href="#">mouse</a>		

[Add selected mice to cart](#)

What do you want to do with mice selected above?

[kill](#) [mate](#) [genotype](#) [add/change experiment](#) [add/change cost centre](#) [order phenotyping](#)

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**Figure 42: Step 1: Defining mating partners.** In the expanded rack view (see 4.4.2), mating partners are selected by checking the box in the first column. The „mate“ button on the page bottom directly leads to step 2. Alternatively, selected mice can be put in the cart, where the „mate“ button is also available.

## 5.1.2 Step 2: Defining mating details

In the second step of the mating procedure, mating details need to be defined by the user. In addition, mating partners are checked automatically if they are qualified for mating (are they still alive? One male, at least one female? Minimum age of xx days?).

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**MausDB DEMO** [View mouse](#)

0 mice in cart [Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

New mating

Checking mating partners

- checking male mouse [50005140](#) for mating ... ok
- checking female mouse [50005146](#) for mating ... ok

Now specify some mating details

Grey fields are mandatory, please check them carefully. White fields are optional and may be left empty.

please choose rack for mating cage <small>or</small> <input type="checkbox"/> don't move	<b>racks from your screen</b> or <b>all racks</b> <input checked="" type="radio"/> 1001-04 (Projekt_1, 38 free slots) <input type="radio"/> 1001-04 (Projekt_1, 38 free slots)	[optional: for "new strain" only: name of the new strain] <input type="text" value="129xC57BL/6"/>
strain strain that litter from this mating will be assigned to	<input type="text" value="new strain"/>	[optional: for "new line" only: name of the new line] <input type="text" value="HIJ-B-B6"/>
line line that litter from this mating will be assigned to	<input type="text" value="HIJ-B-B6"/>	[optional: for "new line" only: name of the new line] <input type="text"/>
mating date date of mating	<input type="text" value="10.05.2007 16:40:33"/>	
mating project assign a screen/project	<b>your screens/projects only</b> or <b>all screens/projects</b> <input checked="" type="radio"/> Projekt_1 <input type="radio"/> Projekt_1	
[optional: mating name] give your mating a unique name	<input type="text"/>	
[optional: mating scheme] inbred, outcross, ...	<input type="text"/>	
[optional: mating purpose] your own description	<input type="text"/>	
[optional: generation] something like F1,F2,...	<input type="text"/>	
[optional: comment] any comment	<input type="text"/>	

[cancel mating \(go to previous page\)](#)

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**Figure 43: Step 2: Defining mating details.** Per default, a mating is automatically set up in a new cage where mice are put together. As a consequence, the user can choose the rack in the first table row. Alternatively, checking the „don't move“ box will cause MausDB to leave mating partners where they are. Strain (genetic background) of mating offspring needs to be chosen in the second table row from a pulldown menu. Alternatively, a new strain can be defined by choosing „new strain“ in the pulldown menu and entering a new strain in the input field. The same procedures applies for mouse line selection in the third table row. Mating date refers to the date when the mating really started. Defining a mating project will remember project assigned users about litter weaning. Other fields can be optionally filled by users. Pressing the „mate!“ button will finally set up the mating and present a confirmation page (see below).

## 5.1.3 Step 3: Confirmation

If the mating could be successfully set up in the database, a confirmation page is displayed.

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**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

New mating: trying to set up new mating in the database

**Checking mating partners**

- checking male mouse 50005140 for mating ... ok
- checking female mouse 50005146 for mating ... ok

**Moving mice**

- moved mouse 50005140 from cage 0156 to cage 0240
- moved mouse 50005146 from cage 0225 to cage 0240

**Setting up new mating**

Mating successfully set up in [cage 0240 \(print cage card\)](#).

See [mating 493](#) for details.

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Figure 44: Step 3: Confirmation. Clickable links for mating ID and mating cage are displayed.

## 5.2 How to set up an embryo transfer

In MausDB, an embryo transfer essentially is a special case of a mating. In a normal mating, both mating partners are already managed by MausDB and thus have a mouse ID.

In an embryo transfer, the real mating event may have taken place even long time ago outside the facility that is managed by MausDB if frozen embryos are used. The MausDB embryo transfer procedure records the event of implanting an embryo of whatever origin to a recipient female mouse. As soon as this is done, an equivalent to a normal mating is defined and subsequently litters can be reported and weaned.

Embryo transfers only can be started from the cart. Another difference to setting up a normal mating is that the biological father can be optionally defined if available as a MausDB mouse or left out if it is an external mouse. The recipient female mouse must have a mouse ID, i.e. be defined in MausDB.

Your mouse "shopping cart"

There are 2 mice in your "shopping cart"

#	<a href="#">mouse ID</a>	<a href="#">ear</a>	<a href="#">sex</a>	<a href="#">born</a>	<a href="#">age</a>	<a href="#">death</a>	<a href="#">genotype</a>	<a href="#">strain</a>	<a href="#">line</a>	<a href="#">room/rack / cage</a>	<a href="#">comment (shortened)</a>
1	<input checked="" type="checkbox"/> 50003930	30	f	13.09.2006	240	-	y	-	HD-B-B6	<a href="#">1001/01-0005</a>	
2	<input type="checkbox"/> 50005136	36	m	13.03.2007	59	-	y	-	HIJ-B-B6	<a href="#">1001/01-0012</a>	
#	<a href="#">mouse ID</a>	<a href="#">ear</a>	<a href="#">sex</a>	<a href="#">born</a>	<a href="#">age</a>	<a href="#">death</a>	<a href="#">genotype</a>	<a href="#">strain</a>	<a href="#">line</a>	<a href="#">room/rack / cage</a>	<a href="#">comment (shortened)</a>

[Empty cart](#) [Remove selected from cart](#) [Keep selected in cart](#)

**cart name:**  **public?**  [Save cart](#) **or** [Load cart](#) [Export cart to Excel](#)

---

What do you want to do with mice selected above?

[kill](#) [mate](#) [embryotransfer](#) [genotype](#) [add/change experiment](#) [add/change cost centre](#)

[order phenotyping](#) [view phenotyping data](#) [append comment](#) [upload and link file to selected mice](#)

[1](#) [select random subset](#)

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Figure 45: Step 1: Select a female embryo recipient mouse in the cart. Optionally also select the biological father mouse (sperm donor) if available in MausDB. Start embryo transfer procedure by clicking the „embryo transfer“ button in the bottom task bar.

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**MausDB DEMO**

 [View mouse](#)

2 mice in cart ([empty cart](#))

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

### New embryo transfer

**Checking selected mice**

- checking recipient mother [50003930](#) for use in embryo transfer ... ok

**Now specify some embryo transfer details**

Grey fields are mandatory, please check them carefully. White fields are optional and may be left empty.

date of embryo transfer <small>date of embryo transfer</small>	11.05.2007 10:34:22 <input style="width: 20px; height: 15px;" type="button" value="..."/>
strain <small>strain that litter from this embryo transfer will be assigned to</small>	C57BL/6J <input style="width: 20px; height: 15px;" type="button" value="..."/> [optional: for "new strain" only: name of the new strain] <input type="text"/>
line <small>line that litter from this embryo transfer will be assigned to</small>	new line <input style="width: 20px; height: 15px;" type="button" value="..."/> [optional: for "new line" only: name of the new line] <input type="text"/> TNFa-KO
embryo	embryo ID : <input type="text" value="TNFa-123-07"/> origin <input type="text"/>
embryo production <small>How has the embryo been produced?</small>	<b>method:</b> <input checked="" type="radio"/> in vivo <input checked="" type="radio"/> in vitro <b>sperm:</b> <input checked="" type="radio"/> fresh <input type="radio"/> frozen <b>assisted IVF:</b> <input checked="" type="radio"/> none <input type="radio"/> Laser IVF <input type="radio"/> ICSI
embryo preservation <small>How has the embryo been preserved?</small>	<input checked="" type="radio"/> fresh <input type="radio"/> revitalized
transgenic manipulation <small>How has the embryo been manipulated?</small>	<input checked="" type="radio"/> no manipulation in-house <input type="radio"/> knockout (blastocyst injection) background of donor cells: <input type="text"/> background of ES cell line: <input type="text"/> name of construct / line: <input type="text"/> <input type="radio"/> transgenic animal (pronucleus injection) background of donor cells: <input type="text"/> name of construct / line: <input type="text"/>
recipient mother(s)	<a href="#">50003930</a>
genetic father - internal	
genetic father - external	external mouse ID : <input type="text" value="TNFa-123"/> origin <input type="text"/> cooperation_partner
embryo transfer project <small>assign a screen/project</small>	your screens/projects only or all screens/projects <input checked="" type="radio"/> Projekt_1 <input style="width: 20px; height: 15px;" type="button" value="..."/> <input type="radio"/> Projekt_1 <input style="width: 20px; height: 15px;" type="button" value="..."/>
[optional: embryo transfer name] <small>give your embryo transfer a unique name</small>	<input type="text"/>
[optional: embryo transfer purpose] <small>your own description</small>	<input type="text"/>
[optional: comment] <small>any comment</small>	<input type="text"/>

[cancel embryo transfer \(go to previous page\)](#)

**Figure 46: Step 2: Defining embryo transfer details.** Embryo transfer date refers to the date when the embryo really was implanted. Strain (genetic background) of mating offspring needs to be chosen in the second table row from a pulldown menu. Alternatively, a new strain can be defined by choosing „new strain“ in the pulldown menu and entering a new strain in the input field. The same procedures applies for mouse line selection in the third table row. In the following rows, additional embryo transfer information can be given. Defining a project will remember project assigned users about litter weaning. Other fields can be optionally filled by users. Pressing the „setup transfer!“ button will finally set up the embryo transfer and present a confirmation page (see below).

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**MausDB DEMO**

2 mice in cart ([empty cart](#)) [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

New mating: trying to set up new mating (type: embryo transfer) in the database

**Checking mating partners**

- checking female mouse 50003930 for mating ... ok

**Moving mice**

- mouse 50003930 stays in cage 0005

**Setting up new mating**

Mating (type: embryo transfer) successfully set up in [cage 0005 \(print cage card\)](#).  
See [mating 494](#) for details.

Page generated on Fri May 11 10:44:10 2007

Figure 47: Step 3: Confirmation. Clickable links for mating ID and mating cage are displayed.

Logged in as admin ([log out](#)) Help

**MausDB DEMO**

2 mice in cart ([empty cart](#)) [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

**Mating details** [previous](#) [next](#)

**Parents of mating 494**

#	<input type="checkbox"/>	role	entered mating	left mating	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage	parental status
1	<input checked="" type="checkbox"/>	recipient mother	11.05.2007	-	50003930	30	f	13.09.2006	240	-	y	-	HJ-B-B6	1001/01-0005	<a href="#">remove</a>

[Add selected mice to cart](#)

---

**Litters from mating 494** [report new litter](#)

No litters found for [mating 494](#)

---

**Details for mating [mating 494](#)**

<b>Mating type</b>	<a href="#">embryo transfer 6</a>	
<b>Mating name</b>	""	
<b>Mating start</b>	11.05.2007	
<b>Mating end</b>	Stop mating: <input type="text" value="11.05.2007 10:47:26"/> <input type="button" value="Stop mating"/> enter date/time for mating end	<input type="button" value=""/>
<b>Strain</b>	C57BL/6J	
<b>Line</b>	ABC-B-CON	
<b>Mating scheme</b>	embryo transfer	
<b>Mating purpose</b>		
<b>Mating generation</b>		
<b>assigned project</b>	Projekt_1	
<b>mating comment</b>	<div style="border: 1px solid #ccc; padding: 5px; height: 60px; width: 100%;"></div>	
	<a href="#">update mating comment</a>	

Figure 48: Mating details view for an embryo transfer. The first row of the second table (Mating type) contains a clickable link that leads to an embryo transfer specific view (see below).

Logged in as admin ([log out](#)) [Help](#)

 2 mice in cart ([empty cart](#)) [View mouse](#)

**MausDB DEMO**

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Embryo transfer details

Details for embryo transfer [transfer 6](#)

embryo transfer	6
mating id	<a href="#">mating 494</a>
embryo id	TNFa-123-07
embryo production	in_vitro
embryo preservation	fresh
transgenic manipulation	no_manipulation
background of donor cells	
embryo transfer comment	External genetic father: TNFa-123 (cooperation_partner)

---

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**Figure 49:** Embryo transfer details view.

### 5.3 How to report litter

As soon as newborns are observed, they can be reported to the database. Litter reporting is a precondition for weaning in MausDB. Litter reporting always starts from the mating details page of the mating where litter has to be reported.

Mating details  [previous](#) [next](#)

Parents of [mating 492](#)

#	<input type="checkbox"/>	role	entered mating	left mating	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage	parental status
1	<input type="checkbox"/>	father	28.03.2007	-	50004776	76	m	29.01.2007	102	-	+/-	-	ABC-C3H	1002/09-0223	<a href="#">remove</a>
2	<input type="checkbox"/>	mother	28.03.2007	-	50004780	80	f	29.01.2007	102	-	+/-	-	ABC-C3H	1002/09-0223	<a href="#">remove</a>

[Add selected mice to cart](#)

---

Litters from [mating 492](#) [report new litter](#)

No litters found for [mating 492](#)

---

Details for mating [mating 492](#)

Mating type	normal mating	
Mating name	-	
Mating start	28.03.2007	
Mating end	Stop mating: <input type="text" value="11.05.2007 13:13:29"/>  Stop mating	enter date/time for mating end
Strain	-	
Line	ABC-C3H	
Mating scheme	-	
Mating purpose	-	
Mating generation	-	
assigned project	Projekt_2	
mating comment	   	
	<a href="#">update mating comment</a>	

**Figure 50:** Step 1: Report litter for the correct mating. Between parents table and mating details box, the button „report new litter“ can be used to report litter for the current mating.

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**MausDB DEMO**

2 mice in cart  
(empty cart) [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Report new litter for [mating 492](#)

**1. Step: Please specify parents for this litter**

Using all parents of this mating as default, please uncheck mothers that can be excluded

#	is parent	role	entered mating	left mating	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage
1	<input checked="" type="checkbox"/>	father	28.03.2007	-	50004776	76	m	29.01.2007	102	-	+/-	-	ABC-C3H	1002/09-0223
2	<input checked="" type="checkbox"/>	mother	28.03.2007	-	50004780	80	f	29.01.2007	102	-	+/-	-	ABC-C3H	1002/09-0223

---

**2. Step: Please enter litter details**

date of birth	11.05.2007 13:23:00 <input style="width: 20px; height: 15px; vertical-align: middle;" type="button" value="..."/>			
please enter date of birth (dd:mm:yyyy hh:mm:ss)				
living pups	total 0	male 4	female 5	
dead	total 1	male 0	female 0	
reduced	0	if any reduced, why?		
litter comment				

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**Figure 51: Step 2: Specifying litter details.** In the upper table, parents have to be assigned to the litter. If, for example, a double mating (one male, two females) has been setup and there is clear evidence for one female being the mother of newborns, the other female mouse can be unchecked to state it is not the mother. In the second box, date of birth has to be entered. Numbers for observed newborns as well as a litter comment can be entered below. Litter report is finished by pressing „Report litter“.

---

Litters from [mating 492](#)

#	born	weaned	# weaned or # alive	# reduced	comment
1. litter	11.05.2007	not yet weaned: <a href="#">delete</a> <a href="#">wean</a>	9	0	"

---

Details for mating [mating 492](#)

**Figure 52: Step 3: Confirmation.** After pressing „Report litter“, the litter has been added to the litters table in the current mating view. Clicking on the litter (column 1) will lead to the litter details page (see 4.7.5). Using the links in the third column, the litter can be deleted or weaned, respectively.

## 5.4 How to wean litter or report litter loss

As soon litter has been reported to MausDB, it can be weaned. The weaning procedure either starts from the litters table in the mating view (see Figure 52) or from the litters table in the Home area (see Figure 10). In either case, a click on the weaning link will start the weaning dialog.

The weaning procedure in MausDB includes the generation of mouse IDs for all weaned mice, eartag assignment and rack/cage allocation of these mice.

In the following example, a litter with 3 males is weaned:

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**MausDB DEMO**

2 mice in cart ([empty cart](#)) [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

**Litter details**

**1. Litter from mating 489 : weaning overview**

birth date	weaning date	alive			dead			reduced		
		total	male	female	total	male	female	total	why	
18.04.2007	-	0	3	0	0	0	0	-		
<b>comment</b>								<a href="#">update litter comment</a>		

**1. litter from mating 489 : parents**

#	<input type="checkbox"/>	role	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage
1	<input checked="" type="checkbox"/>	father	50004622	22	m	05.01.2007	126	-	wt [*]	-	ABC-FLP-CON	1001/02-0269
2	<input checked="" type="checkbox"/>	mother	50004625	25	f	05.01.2007	126	-	+/- [*]	-	ABC-FLP-CON	1001/02-0269

[Add selected mice to cart](#)

Pups not weaned yet ([click to wean](#) or [report litter loss](#) )

**What do you want to do with mice selected above?**

[kill](#) [mate](#) [genotype](#) [add/change experiment](#) [add/change cost centre](#) [order phenotyping](#)

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**Figure 53: Step 1: Starting the weaning dialog from the litter details view (see 4.7.5). An already reported litter can be weaned by following the „click to wean“ link on the bottom. Alternatively, if pups are gone, this can be reported by following the „report litter loss“ link.**

Logged in as admin ([log out](#)) [Help](#)

**MausDB DEMO**

 2 mice in cart ([empty cart](#)) [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Weaning: 1. step

1. step: Please enter litter details for 1. litter from [mating 489](#)

line	ABC-FLP-CON	
strain	-	
date of birth	18.04.2007 14:03:00	 please check date of birth!
date of weaning	09.05.2007 09:00:00	
weaning type please specify	<input type="radio"/> regular <input checked="" type="radio"/> external	'external' mice will not be taken into account for TEP reporting or cost calculations
are these mice genetically modified (GVOs)?	<input checked="" type="radio"/> yes <input type="radio"/> no	default has been determined automatically by parent gvo status, so please check!
cost centre <a href="#">[help]</a> assign a cost centre Who will pay for the mouse housing costs?	Cost centre to bill mouse housing costs to: <a href="#">MausDB_account_1</a>	
males	females	
how many pups from this litter do you want to wean?	3	0
optional: maximum number in one cage	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input checked="" type="radio"/> 5 (only applies for new cages)	
optional: start ear tag	01	01
optional: use existing cages	(example: 13; 543 8;876) (example: 17; 0548 89)	
optional: litter comment		

[next step](#) or [go back](#)

**Figure 54: Step 2: Defining litter details.** In the third and fourth row, date of birth and weaning need to be controlled. In most cases, weaning type should be „regular“. Mice can be weaned as „external“ mice if they need to be managed by MausDB (e.g. for data completeness or family relationship preservation), but do live in rooms/racks, that are outside the facility which is managed by MausDB. Important: external mice are not taken into account when calculating mouse days (see 4.13.6) or numbers for the TEP report (see 4.13.3). The numbers of males and females are automatically set from previous litter reporting, but can be changed in this dialog. The maximum number of mice per cage can be selected. If males should be caged individually, the number would be set to 1. In the course of weaning, eartags are incrementally assigned starting from the given number. Alternatively, it can be set to consist of the last two digits of the mouse ID by choosing „by ID“ in the pulldown menu. In order to fill up existing cages (cages currently in use), the correspondent cage IDs can be entered. Pressing „next step“ will lead to step 2.

## Weaning: 2. step

### 2. step: assign eartags and weaning cages

male pups

#	mouse id	eartag	sex	born	line	strain	color	cage	rack	comment	remark
1	to be assigned	01	m	18.04.2007	ABC-FLP-CON	-	n/d	new_1	select rack below!		
2	to be assigned	02	m	18.04.2007	ABC-FLP-CON	-	n/d	new_1	select rack below!		
3	to be assigned	03	m	18.04.2007	ABC-FLP-CON	-	n/d	new_1	select rack below!		

choose racks for new male cages

cage	rack	info
all	1001-02 (Projekt_1, 12 free slots)	choose rack for all cages
new_1	1001-02 (Projekt_1, 12 free slots)	

[update weaning preview](#) or [go back](#)

no female pups to wean

[update weaning preview](#) or [go back](#)

**Figure 55: Step 2: Eartag and cage assignment.** The top table shows a preview for weaned mice. Mouse IDs (first column) will be generated at weaning time, eartags are incremented from the start tag given before or will be set according to the last two digits of the mouse ID at weaning time. In case no cages were given to fill up with weaned litter, cage IDs will be determined at weaning time, so they cannot be displayed here. Instead, a temporary cage ID placeholder („new\_1“) will be displayed. This cage ID placeholder can be edited at this stage. The placeholder can be anything but a number, which would be interpreted as real cage ID. Mice assigned to the same cage ID placeholder will be caged together. The second table allows to assign cages to racks. This can be done individually or for all cages (first row). Pressing „update weaning preview“ will re-check for errors and the availability of cages and racks and can be repeated again and again. The screen is splitted for male and female pups. The update procedure affects both. As soon as every cage is assigned to a rack and no errors are detected, the „next step“ button occurs at the very bottom, which will lead to the next step.

## Weaning: 3. step

### 3. step: check and confirm

male pups

#	mouse id	eartag	sex	born	line	strain	color	cage	rack	comment	remark
1	to be assigned	01	m	18.04.2007	ABC-FLP-CON	-	n/d	new_1	1001-02		
2	to be assigned	02	m	18.04.2007	ABC-FLP-CON	-	n/d	new_1	1001-02		
3	to be assigned	03	m	18.04.2007	ABC-FLP-CON	-	n/d	new_1	1001-02		

no female pups to wean

Please check weaning data carefully!

If anything is wrong in the tables above, go back to the previous step and make your changes

[wean!](#) or [go back](#)

**Figure 56: Step 3: Final preview.** A final preview is displayed. Pressing „wean!“ will start the weaning transaction.

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**MausDB DEMO**

 0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Weaning: 4. step

4. step: wean

male pups

#	<input type="checkbox"/>	mouse ID	ear	sex	color	born	age	strain	line	room/rack	cage	comment (shortened)	weaning remark
1	<input type="checkbox"/>	<a href="#">50005152</a>	01	m	n/d	18.04.2007	27	-	ABC-FLP-CON	1001-02	<a href="#">0283</a>		ok
2	<input type="checkbox"/>	<a href="#">50005153</a>	02	m	n/d	18.04.2007	27	-	ABC-FLP-CON	1001-02	<a href="#">0283</a>		ok
3	<input type="checkbox"/>	<a href="#">50005154</a>	03	m	n/d	18.04.2007	27	-	ABC-FLP-CON	1001-02	<a href="#">0283</a>		ok

no female pups to wean

**Print cage cards**

You may want to print (new) cage cards for all cages involved in the weaning. Please use the links below.

- [print card for cage 0283](#)

**Weaning successful!**

You may want to see weaned litter [here](#)

[Add selected mice to cart](#)

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**Figure 57: Step 4: Confirmation.** As the weaning has been completed, mouse and cage IDs are available and displayed as clickable links. Links to cage cards are displayed for every cage.

## 5.5 How to import mice

Mice that are not weaned within the facility that is managed by MausDB must be imported in order to get mouse IDs. The import procedure in MausDB includes the generation of mouse IDs for all imported mice, eartag assignment and rack/cage allocation of these mice.

In the following example, a batch of 3 males is imported:

Import: 1. step

1. Please enter some details for your import

date of import	15.05.2007 14:23:17	<input type="button" value="please check date of import!"/>
import type please specify	<input checked="" type="radio"/> regular <input type="radio"/> external	external' mice will not be taken into account for TEP reporting or cost calculations
strain strain that litter from this import will be assigned to	C57BL/6J-BTNT	[optional: for "new strain" only: name of the new strain]
line line that litter from this import will be assigned to	ABC-129	[optional: for "new line" only: name of the new line]
are imported mice genetically modified (GVOs)?	<input checked="" type="radio"/> yes <input type="radio"/> no	please choose GVO status of imported mice!
import for project assign a screen/project Which project will take care for the mice?	your screens/projects only or all screens/projects <input checked="" type="radio"/> Projekt_1 <input type="radio"/> Projekt_1	
cost centre [help] assign a cost centre Who will pay for the mouse housing costs?	Cost centre to bill mouse housing costs to: MausDB_account_1	
provider who sent you the mice?	Dr. Müller-Smith, Berlin	
optional: owner(s) (of intellectual property)		
optional: import name		
optional: import comment		

2. how do you want to import your mice?

a) Upload from Excel file (You can find a sample Excel file [here](#).)

D:\Documents and Settings\holger.maier\My Documents\import\_template.xls

-OR-

b) use form to import mice manually

import 0 males and 0 females

or [go back](#)

**Figure 58: Step 1: Defining import details.** Top Box: In the first row, the date of import needs to be given. In most cases, import type should be „regular“. Mice can be imported as „external“ mice if they need to be managed by MausDB (e.g. for data completeness or family relationship preservation), but do live in rooms/racks, that are outside the facility which is managed by MausDB. Important: external mice are not taken into account when calculating mouse days (see 4.13.6) or in the TEP report (see 4.13.3). Strain (genetic background) and line can be chosen from a pulldown menu. Alternatively, new ones can be defined by selecting „new strain“ or „new line“ from the pulldown menu. In the fifth line, it must be stated whether imported mice are genetically modified or not. Project and cost centre assignment are followed by the input field for the mouse provider. All other fields in the top box are optionally.

There are two ways to import mice. a) import of batch mouse data from a spreadsheet file or b) manual input of mouse data (recommended only for < 5 mice). When using import from spreadsheet file, a template file must be used (available as link).

Pressing „next step“ will lead to step 2.

	A	B	C	D	E	F	G	H	I
1	CATID	earTag	conTag	Strain	sex	DOB	Pald	Mald1	Mald2
2	10153249	99		1000 BLc	f	17.01.1998	10138239	10138242	
3	10153250	98		1000 BLc	f	17.02.1998	10138239	10138242	
4	10153448	01		1000 BLc	f	23.01.1998	10142679	10142682	
5	10153451	96		1000 BLc	f	25.01.1998	10138227	10138231	
6	10153452	15		1 BLc	f	25.01.1998	10138227	10138231	
7	10151884	16		1 C3H	f	30.12.1997	10144912	10144719	

Figure 59: Spreadsheet template file. Batch mouse data can be imported from a file. Important: column headers must be exactly as shown here. Columns: A: mouse ID, C: cage ID, E: sex (f/m), F: date of birth (dd.mm.yyyy), G: ID of father, H: ID of mother1, I: ID of mother2 (optional)

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**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Import: 2. step

Trying to upload Excel file ...  
... file import\_template.xls successfully uploaded

Using the first sheet of uploaded file **import\_template.xls** (14848 bytes), which contains 3 rows of data:

Line	MausDB ID	external ID	ear tag	cage	sex	born	father	1. mother	2. mother	comment
2	to be assigned	10153249	99	new_1000	<input type="radio"/> m <input checked="" type="radio"/> f	17.01.1998	10138239	10138242		
3	to be assigned	10153250	98	new_1000	<input type="radio"/> m <input checked="" type="radio"/> f	17.02.1998	10138239	10138242		
4	to be assigned	10153448	01	new_1000	<input type="radio"/> m <input checked="" type="radio"/> f	23.01.1998	10142679	10142682		

[next step](#) or [go back](#)

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Figure 60: Step 2: Data capture from Excel file. Data can be controlled and edited, if necessary.

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0 mice in cart [View mouse](#)

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---

Import: 3. step

3. step: check/update form data

	MausDB ID	external ID	ear tag	cage	rack	sex	born	father	1. mother	2. mother	comment	remark
1	to be assigned	10153249	99	new_1000	select rack below!	f	17.01.1998	10138239	10138242			
2	to be assigned	10153250	98	new_1000	select rack below!	f	17.02.1998	10138239	10138242			
3	to be assigned	10153448	01	new_1000	select rack below!	f	23.01.1998	10142679	10142682			

[update import preview](#)

choose racks for new cages

cage	rack	info
all cages	1001-01 (Projekt_1, 29 free slots) <input type="button" value="▼"/>	choose rack for all cages
new_1000	1001-01 (Projekt_1, 29 free slots) <input type="button" value="▼"/>	3 female(s)

[update import preview](#)

Figure 61: Step 3: Eartag and cage assignment. See Figure 55 for explanation.

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**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Import: 4. step

4. step: confirm import data

#	MausDB ID	external ID	ear tag	cage	rack	sex	born	father	1. mother	2. mother	comment	remark
1	to be assigned	10153249	99	new_1000	1001-01	f	17.01.1998	10138239	10138242			
2	to be assigned	10153250	98	new_1000	1001-01	f	17.02.1998	10138239	10138242			
3	to be assigned	10153448	01	new_1000	1001-01	f	23.01.1998	10142679	10142682			

[import!](#)

Figure 62: Step 4: Final preview. A final preview is displayed. Pressing „import!“ will start the import transaction.

Logged in as admin ([log out](#)) Help

**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Import: 5. step

5. step: import

imported mice

#	<input type="checkbox"/>	MausDB ID	external ID	ear	sex	color	born	age	strain	line	room/rack	cage	father	1. mother	2. mother	comment (shortened)	import remark
1	<input checked="" type="checkbox"/>	50005155	10153249	99	f	n/d	17.01.1998	3405	C57BL/6J-BTNT	ABC-129	1001-01	0296	10138239	10138242			ok
2	<input checked="" type="checkbox"/>	50005156	10153250	98	f	n/d	17.02.1998	3374	C57BL/6J-BTNT	ABC-129	1001-01	0296	10138239	10138242			ok
3	<input checked="" type="checkbox"/>	50005157	10153448	01	f	n/d	23.01.1998	3399	C57BL/6J-BTNT	ABC-129	1001-01	0296	10142679	10142682			ok

Print cage cards [and optionally: set up matings for mixed cages]

You may want to print (new) cage cards for all cages involved in the import. Please use the links below.

You may also want to setup matings for all cages containing both males and females.

<a href="#">[Optional: set up mating(s) in separate windows first ... ] (mating setup dialog will open in new window)</a>	<a href="#">then print cage card(s)</a>
<a href="#">print card for cage 0296</a>	

Import successful!

You may want to see imported mice [here](#)

[Add selected mice to cart](#)

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Figure 63: Step 5: Confirmation. As the import has been completed, mouse and cage IDs are available and are displayed as clickable links. Links to cage cards are displayed for every cage. If import leads to mixed (males and females) cages, matings can be set up quickly by following optional links.

## 5.6 How to genotype mice

In MausDB, genotyping a mouse means to assign a locus-related genotype term to a mouse. As multiple genotypes can be managed by MausDB, a combination of locus/marker (e.g. “TNFalpha”) and genotype term (e.g. “+/-”) is stored.

In the following example, three mice from the previous import example have been put in the cart:

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**MausDB DEMO**

3 mice in cart ([empty cart](#)) [View mouse](#)

Your mouse "shopping cart"

There are 3 mice in your "shopping cart"

#	<input type="checkbox"/> mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack / cage	comment (shortened)
1	<input checked="" type="checkbox"/> 50005155	99	f	17.01.1998	3405	-		C57BL/6J-BTNT	ABC-129	<a href="#">1001/01-0296</a>	
2	<input checked="" type="checkbox"/> 50005156	98	f	17.02.1998	3374	-		C57BL/6J-BTNT	ABC-129	<a href="#">1001/01-0296</a>	
3	<input checked="" type="checkbox"/> 50005157	01	f	23.01.1998	3399	-		C57BL/6J-BTNT	ABC-129	<a href="#">1001/01-0296</a>	

[Empty cart](#) [Remove selected from cart](#) [Keep selected in cart](#)

cart name  public?  [Save cart](#) or [Load cart](#) or [Export cart to Excel](#)

What do you want to do with mice selected above?

[kill](#) [mate](#) [embryotransfer](#) [genotype](#) [add/change experiment](#) [add/change cost centre](#)

[order phenotyping](#) [view phenotyping data](#) [append comment](#) [upload and link file to selected mice](#)

[1](#) [select random subset](#)

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**Figure 64: Mouse selection.** In the cart, mice are selected using the checkboxes. Pressing „genotype“ in the bottom functions bar will lead to the genotyping procedure.

Logged in as admin ([log out](#)) [Help](#)

**MausDB DEMO**

3 mice in cart ([empty cart](#)) [View mouse](#)

Enter genotype/phenotype information: 1. step

1) Please choose the genetic marker to which genotype/phenotype information refers  
(defaults to genetic marker defined by mouse line)

Genetic marker:  **please check genetic marker!**

2a) Either choose genotype/phenotype that applies for all mice ...  
Genotype or phenotype for all mice  this will be used for all mice unless left on "ignore"!

2b) ... or enter genotype/phenotype information for mice listed below individually

mouse id	ear	sex	cage	genotype/phenotype
50005155	99	f	0296	+/- <input type="button" value=""/>
50005156	98	f	0296	-/- <input type="button" value=""/>
50005157	01	f	0296	+/- <input type="button" value=""/>

[confirm genotypes](#)

[cancel genotyping \(go to previous page\)](#)

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**Figure 65: Step 1: Genotype assignment.** In the first step, the locus / genetic marker to which the genotype refers must be chosen from a pulldown menu. In the second step, genotype terms can be assigned individually (2b) or for the whole set of mice (2a). Important: when assigning genotypes individually, „ignore“ must be selected in the upper pulldown menu. Pressing „confirm genotypes“ leads to the next step.

Logged in as admin ([log out](#)) Help

 3 mice in cart ([empty cart](#)) [View mouse](#)

**MausDB DEMO**

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Enter genotype/phenotype information: 2. step

Please confirm

mouse id	ear	sex	cage	genetic marker	genotype/phenotype
50005155	99	f	0296	abc	+/-
50005156	98	f	0296	abc	-/-
50005157	01	f	0296	abc	+/-

[genotype!](#)

**Figure 66: Step 2: Preview.** After final preview, the genotype procedure can be started by pressing „genotype!“.

Logged in as admin ([log out](#)) Help

 3 mice in cart ([empty cart](#)) [View mouse](#)

**MausDB DEMO**

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Enter genotype/phenotype information: 2. step

Trying to enter/update genotype information

mouse id	ear	sex	cage	genetic marker	genotype/phenotype	genotyping remark
50005155	99	f	0296	abc	+/-	inserted genotype/phenotype
50005156	98	f	0296	abc	-/-	inserted genotype/phenotype
50005157	01	f	0296	abc	+/-	inserted genotype/phenotype

Genotyping done. You may view genotyped mice [here](#)

**Figure 67: Step 3: Confirmation**

## 5.7 How to change cost centre assignment for mice

During the life of a mouse, the cost centre that has been assigned at weaning or import time, may change. In the mouse details page (see 4.6) or the cart, the bottom function bar contains a button “add/change cost centre” (see below).

What do you want to do with this mouse?

[kill](#)   [mate](#)   [genotype](#)   [add/change experiment](#)   [add/change cost centre](#)   [order phenotyping](#)

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**Figure 68: The standard function bar that is available on the bottom of the mouse details page, the rack and cage view, and the cart.**

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**MausDB DEMO**

 3 mice in cart ([empty cart](#)) [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Add mice to cost centre or change cost centre: 1. step

Please choose the cost centre you wish chosen mice to be added or changed to ([see cost centres overview](#))

Cost centre	<select style="width: 100%;">MausDB_account_1</select>								
Date (at which mice entered (new) cost centre)	<input type="text" value="15.05.2007 15:30:01"/> <input type="button" value="..."/>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">mouse id</th> <th style="width: 10%;">ear</th> <th style="width: 10%;">sex</th> <th style="width: 60%;">cost centre</th> </tr> <tr> <td style="padding: 2px;">50005155</td> <td style="padding: 2px;">99</td> <td style="padding: 2px;">f</td> <td style="padding: 2px; color: red;">mouse already already is assigned to a cost centre. If you continue, the cost centre will be updated.</td> </tr> </table>	mouse id	ear	sex	cost centre	50005155	99	f	mouse already already is assigned to a cost centre. If you continue, the cost centre will be updated.	
mouse id	ear	sex	cost centre						
50005155	99	f	mouse already already is assigned to a cost centre. If you continue, the cost centre will be updated.						
<input type="button" value="confirm cost centre"/>									

**Figure 69:** Changing the cost centre for a mouse. The new cost centre can be selected from a pulldown menu. The date of cost centre change must be given. The current cost centre assignment is displayed. Pressing the „confirm cost centre“ button will lead to a preview page, where the procedure can be finalized.

## 5.8 How to change experiment status of mice

According to German law, mice that are subject to experiments must be reported. The normal case in MausDB is defined as “breeding”. When a mouse starts into an experiment, date of experiment start and the experiment itself must be reported. At any time a mouse can be assigned to no or one experiment. However, during lifetime of a mouse it can be assigned to several consecutive experiments

As with cost centre assignment (see 5.7), this can be done for one mouse from the mouse details page or for multiple mice from the cart, cage or rack view.

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**MausDB DEMO**

 3 mice in cart ([empty cart](#)) [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

---

Add mice to experiment or change experiment: 1. step

Please choose the experiment you wish chosen mice to be added or changed to

Experiment	<select style="width: 100%;">234-A7</select>																
Date (at which mice entered (new) experiment)	<input type="text" value="15.05.2007 15:47:17"/> <input type="button" value="..."/>																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">mouse id</th> <th style="width: 10%;">ear</th> <th style="width: 10%;">sex</th> <th style="width: 60%;">experiment status</th> </tr> <tr> <td style="padding: 2px;">50005155</td> <td style="padding: 2px;">99</td> <td style="padding: 2px;">f</td> <td style="padding: 2px;">breeding animal</td> </tr> <tr> <td style="padding: 2px;">50005156</td> <td style="padding: 2px;">98</td> <td style="padding: 2px;">f</td> <td style="padding: 2px;">breeding animal</td> </tr> <tr> <td style="padding: 2px;">50005157</td> <td style="padding: 2px;">01</td> <td style="padding: 2px;">f</td> <td style="padding: 2px;">breeding animal</td> </tr> </table>	mouse id	ear	sex	experiment status	50005155	99	f	breeding animal	50005156	98	f	breeding animal	50005157	01	f	breeding animal	
mouse id	ear	sex	experiment status														
50005155	99	f	breeding animal														
50005156	98	f	breeding animal														
50005157	01	f	breeding animal														
<input type="button" value="confirm experiment"/>																	

**Figure 70:** Step 1: Defining experiment and start date. The current status of selected mice is shown in the bottom box. Pressing „confirm experiment“ leads to a preview page, where the procedure can be finalized.

Add mice to experiment or change experiment: 2. step

Please confirm adding the mice listed below to experiment "234-A7" at "15.05.2007 15:47:17"

mouse id	ear	sex
50005155	99	f
50005156	98	f
50005157	01	f

[add/change experiment!](#)

Figure 71: Step 2: Final preview. Pressing „add/change experiment!“ will finalize the procedure.

Add mice to experiment or change experiment: 3. step

Trying to add experiment information

mouse id	ear	sex	experiment	remark
50005155	99	f	234-A7	added mouse to experiment
50005156	98	f	234-A7	added mouse to experiment
50005157	01	f	234-A7	added mouse to experiment

All done (please check remarks for error messages).

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Figure 72: Step 3: Confirmation. The remarks column may contain error messages.

## 5.9 How to move a mouse to another cage

Starting from the rack or cage view, mice can be transferred to other cages. There are two cases:

- a) moving a mouse to an empty cage. A new cage ID must be assigned and a rack must be assigned to this cage.
- b) moving a mouse to a cage with other mice that is already in use. Cage ID and rack assignment are already defined.

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**MausDB DEMO**

Help

3 mice in cart ([empty cart](#))

Home | racks&cages | search&find | import | reports | settings

Cage view or view another cage

Cage 0296 (placed in rack [1001/01](#), Projekt\_1) contains 3 mice

[print cage card](#) [move cage](#) [rack history of cage ID](#)

Current cage color:

#	<input type="checkbox"/>	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage	comment (shortened)	<a href="#">move mouse</a>
1	<input checked="" type="checkbox"/>	50005155	99	f	17.01.1998	3405	-	+/+	C57BL/6J-BTNT	ABC-129	1001/01-0296		<a href="#">move mouse</a>
2	<input checked="" type="checkbox"/>	50005156	98	f	17.02.1998	3374	-	-/-	C57BL/6J-BTNT	ABC-129	1001/01-0296		<a href="#">move mouse</a>
3	<input checked="" type="checkbox"/>	50005157	01	f	23.01.1998	3399	-	+-/	C57BL/6J-BTNT	ABC-129	1001/01-0296		<a href="#">move mouse</a>

Figure 73: Starting a mouse transfer to another cage from the cage view. Clicking „move mouse“ on the mostright colum will start the move procedure for that mouse.

Move mouse

Move mouse 50005155 from cage [0296](#) in rack [1001-01](#)

1. Step: please choose target cage

move mouse ...

to a new cage      or       to an existing cage: [0005](#) (please enter existing cage id)  
 (a new cage will be placed  
in the rack chosen below)      (this cage will stay where it is,  
below rack selection will be ignored)

2. Step: please choose target rack

racks from your screen      or      all racks

1001-01 (Projekt\_1, 28 free slots)       1001-01 (Projekt\_1, 28 free slots)

[optional step: please specify move date]

15.05.2007 16:05:03

or [cancel \(go to previous page\)](#)

Figure 74: Target cage definition. In the first step, the user must decide whether to move the mouse into a new cage or into an existing cage. In the new cage scenario, the second step defines the target rack for the new cage (which is not necessary when moving into an existing cage). The third step defines data and time of the movement.

Move mouse

Please check and confirm if this is the cage where you want your mouse move to

Target cage 0005 (placed in rack [1001/01](#), Projekt\_1) contains 1 mouse

#	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage
1	50003930	30	f	13.09.2006	244	-	y	-	HJ-B-B6	1001/01-0005

or [cancel \(go to previous page\)](#)

Figure 75: View into an existing cage. In case an existing cage has been chosen as target cage, a view of current mice in this cage is displayed as a means of control. Pressing „move mouse!“ will finalize the procedure.

Move mouse

Moving mouse [50005155](#)

from origin cage: [cage 0296 in origin rack: rack 1001-01](#)  
 to target cage: [cage 0005 in target rack: rack 1001-01](#)

trying to move mouse ... successful.

[print new cage card](#)

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Figure 76: Confirmation of mouse transfer. Clickable links for target cage and rack as well as for the target cage card are displayed.

## 5.10 How to move a cage to another rack

Starting from the rack or cage view, a whole rack (with all mice) can be moved to another rack. Mice in this cage do not change their cage IDs. There is no feature to move all cages of one rack to another rack in one transaction, the cages have to be moved one by one.

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**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

Cage view or view another cage  [Search cage\(s\)](#)

Cage 0018 (placed in rack [1001/01](#), Projekt\_1) contains 2 mice

[print cage card](#) [move cage](#) [rack history of cage ID](#)

Current cage color:  Change to: blue [update color](#)

#	<input type="checkbox"/>	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage	comment (shortened)	move mouse
1	<input type="checkbox"/>	50005138	38	f	13.03.2007	63	-	y	-	HJ-B-B6	1001/01-0018	<a href="#">move mouse</a>	
2	<input type="checkbox"/>	50005139	39	f	13.03.2007	63	-	y	-	HJ-B-B6	1001/01-0018	<a href="#">move mouse</a>	

[Add selected mice to cart](#)

Figure 77: Starting a cage transfer to another rack from the cage view. Clicking „move cage“ on top of the color bar will start the move procedure for that cage.

**Move cage**

Move cage 0018 from rack [1001-01](#)

1) Move date  [\[ \]](#)

2) Please choose target rack

racks from your screen      or      all racks

1001-04 (Projekt\_1, 37 free slots) [\[ \]](#)     1001-01 (Projekt\_1, 28 free slots) [\[ \]](#)

[move cage!](#) or [cancel \(go to previous page\)](#)

Figure 78: Definition of move date and target rack. Racks can be chosen from „own“ project-linked racks or from all racks managed by MausDB. Pressing „move cage!“ will finalize the procedure.

Logged in as admin ([log out](#)) Help

**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

**Move cage**

Moving cage [0018](#) from rack [1001-01](#) to rack [1001-04](#) at 15.05.2007 16:39:11

trying to move cage ... successful.

[print new cage card](#)

Figure 79: Confirmation. The cage transfer is confirmed and a clickable link to the cage card is displayed.

## 5.11 How to cull mice

As with other standard procedures, culling of mice can be started for one mouse from the mouse details page or for multiple mice from the cart, cage or rack view.

Logged in as admin ([log out](#)) Help

**MausDB DEMO**

0 mice in cart [View mouse](#)

[Home](#) | [racks&cages](#) | [search&find](#) | [import](#) | [reports](#) | [settings](#)

Cage view or view another cage  [Search cage\(s\)](#)

Cage 0018 (placed in rack [1001/04](#), Projekt\_1) contains 2 mice

[print cage card](#) [move cage](#) [rack history of cage ID](#)

Current cage color:   Change to: blue [update color](#)

#	<input type="checkbox"/>	mouse ID	ear	sex	born	age	death	genotype	strain	line	room/rack-cage	comment (shortened)	<a href="#">move mouse</a>
1	<input checked="" type="checkbox"/>	<a href="#">50005138</a>	38	f	13.03.2007	63	-	y	-	HJD-B-B6	1001/04-0018	<a href="#">move mouse</a>	
2	<input checked="" type="checkbox"/>	<a href="#">50005139</a>	39	f	13.03.2007	63	-	y	-	HJD-B-B6	1001/04-0018	<a href="#">move mouse</a>	

[Add selected mice to cart](#)

What do you want to do with mice selected above?

[kill](#) [mate](#) [genotype](#) [add/change experiment](#) [add/change cost centre](#) [order phenotyping](#)

Figure 80: Starting from the cage view, mice subject to culling are selected using the checkboxes. Pressing „kill“ in the bottom functions bar will lead to the next step.

Kill

Please confirm killing of animal(s) listed below

- selected for killing: mouse [50005138](#)
- selected for killing: mouse [50005139](#)

... and choose killing reasons

Date and time of death

Killing reason (how): killed

Killing reason (why): breeding excess

[confirm kill](#)

Figure 81: Defining culling date and culling reasons. Pressing „confirm kill“ will finalize the procedure.

Kill

Killing animal(s) listed below

How: "killed"  
Why: "breeding excess"

- trying to kill mouse [50005138](#) ... successfull
- trying to kill mouse [50005139](#) ... successfull

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Figure 82: Confirmation of culling.

# 6 MausDB Administration

## 6.1 Backup database

### 6.1.1 Using backup script

Fully automated backups can be scheduled by using the backup script (described in 2.3.6).

### 6.1.2 Manual backups

At any time, a full dump of the database can be done manually:

```
# mysqldump --opt -u <username> -p<password> mausdb > dumpfile.sql
```

[Please note: this may take some minutes]

### 6.1.3 Restore from backup

A database can be restored from a full dump

**(WARNING: this will overwrite your current database!)**

```
# mysql -u <username> -p<password> mausdb < dumpfile.sql
```

[Please note: this may take considerable time depending on the size of your database]

For more sophisticated restore scenarios like point-in-time recovery, please check the MySQL documentation.

## 6.2 Blocking user interaction (“Global lock”)

There is a mechanism called “global lock” implemented in MausDB that stops user interaction via the web user interface. It is strongly advised to set a global lock in two situations:

- when damage to the database occurred (e.g. by manipulation on database level). Immediately after a database damage occurred or is noticed, a global lock should be set. This prevents new data to be written to the database and facilitates database rollback and point-in-time recovery.
- when the database server needs to be stopped for service or updates.

### 6.2.1 Setting a global lock via web user interface

Log in using an account with admin rights and choose “set or release global locks” from the “settings” menu. The web user interface for non-admin accounts will immediately be blocked.

**Be aware that the web interface for admin accounts will not be blocked** and remains accessible. As admin, you will be able to work with MausDB and finally release the global lock again.

## **6.2.2 Setting a global lock manually**

In case the web user interface is not accessible you may set a global lock manually:

- 1) Open /usr/lib/cgi-bin/mausdb/config.rc in an editor  
`# sudo nano /usr/lib/cgi-bin/mausdb/config.rc`
- 2) set MAUSDB\_LOCK from "false" to "true"
- 3) repair/manipulate the database or run updates on your server ...
- 4) set MAUSDB\_LOCK back to "false"

## **6.3 Administrative overviews and settings**

Users with administrative rights (user\_role = ‘ua’) can access many frequently needed administrative functions via “reports” and “settings” in the main navigation bar.

## **6.4 Administration on database level**

However, some infrequently needed or complex functions are not integrated into the web user interface. In these cases, database manipulation has to be carried out on database level.

Commented SQL scripts for some frequently used tasks are available from the downloaded repository and should be located in **/home/admin/mausdb/SQL**.

**WARNING: MANIPULATION ON DATABASE LEVEL IS PRONE TO GENERATE DATA LOSS OR DATA CORRUPTION!**

**PLEASE NOTE OUR ADVICES ON SQL-LEVEL DATABASE MANIPULATION:**

- 1) Make a full database dump before manipulating the database
- 2) set a global lock before manipulating the database (see 6.2).
- 3) read the commented scripts carefully before running them.
- 4) make sure you fully understand what the scripts are doing before running them.
- 5) in case you feel unsure about 4), ask someone with more SQL skills for help.
- 6) Think twice before executing SQL commands.
- 7) for update commands: make sure there is a “where” clause in your statement
- 8) for delete commands: make sure you also delete corresponding entries in other tables  
in order to maintain referential integrity.