JAX Colony Management System (JAX-CMS or JCMS)

User Guide
JCMS Release 3.4.x

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The development and distribution of this software is made possible by generous grants from the:

National Institute for General Medical Sciences (NIGMS) (Grant number: 1R01GM072863-01)
National Cancer Institute (NCI) (Grant number: P30 CA034196-20)
Howard Hughes Medical Institute

Document modification history

Revision number	*Date*	*Who*	*Comments*
1	10/14/05	bas	Document started
10	11/19/07	dsj	Add sample tracking
11	11/23/07	aames	Add sample tracking guide
13	9/18/08	mmm	Added colony report and MLV
14	9/19/08	BAS	Added experimental data import, updated experimental data section, cage cards
15	12/10/08	BAS	Added plug dates
16	10/23/09	aames	Release 3.4.0 updates

About this document

This User Guide is now available from the JAX Colony Management System Web site (http://colonymanagement.jax.org/index.html) as a separate download from the installation files for those who only need a copy of the documentation.

Document Purpose
This document provides a user guide for the JAX Colony Management System database (JCMS).

Related Documents
ReadMe.html

Audience
Users and database Administrator.

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1 Overview

1.1 What is JCMS?

The Jackson Laboratory's Colony Management System (JCMS) is a multi-user relational database for managing mouse colonies in a research environment. It was developed in response to increased demand within The Jackson Laboratory for a system that would execute the core functionality of colony management from an intuitive, easy-to-use interface.

Since its initial release in 1998 it has been widely used within The Jackson Laboratory and adopted by a number of outside institutions. Some of the salient features that JCMS offers are:

- Tracking individual mice
    - Genotype
    - Uses and status
    - Pedigrees
    - Breeding performance
- Mating records
- Litter records
- Animal cage/pen management
    - Preformatted or user-designed cage cards with optional bar codes
- Experiment setup and tracking
    - Schedule mice
    - User designed metadata
- Track biological samples relating to mice, matings, or litters
- Bulk data entry
- Sophisticated query capabilities
- Data export to Excel
- Hard copy reports
- Handheld computer support
- User configurable

JCMS has an underlying data model that is independent of any specific database management system technology. The software engineers of Computational Sciences worked closely with the scientific research staff to derive a data model that was comprehensive yet flexible enough to fully satisfy the requirements of multiple research labs.

1.2 Types of Information Collected by JCMS

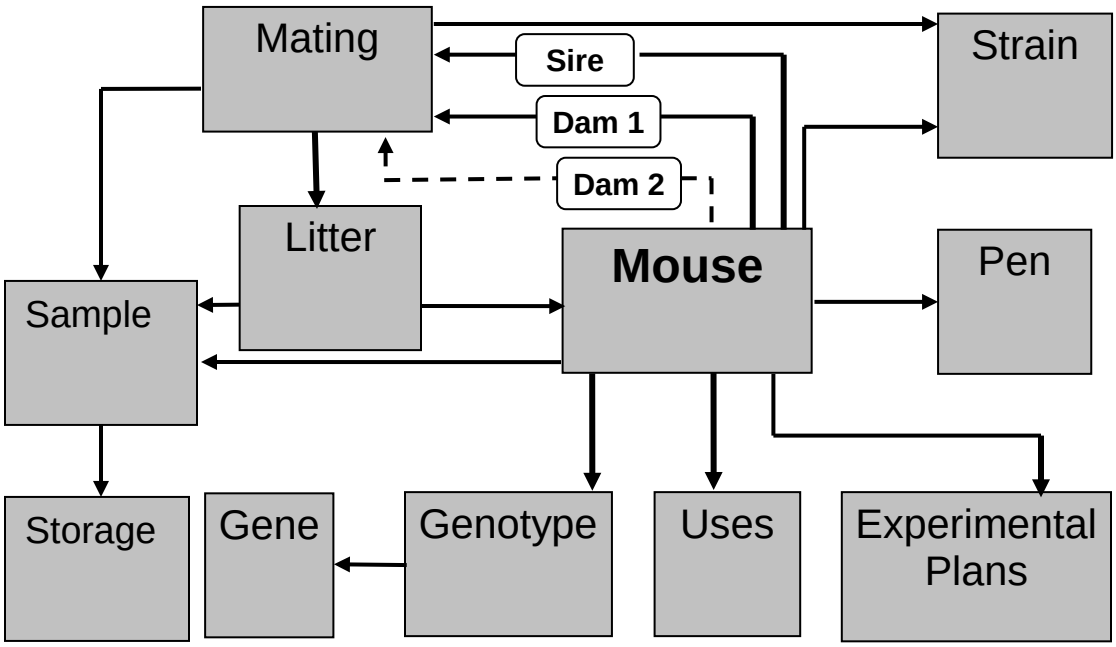


Figure 1-1 Database Overview Diagram

The above diagram shows the main types of information stored by the JCMS database. The mouse is the central entity. A mouse will have a specific strain and multiple genotypes associated with it. Two or three mice are set up in a mating. Each mating can be tracked individually from pre-design to retirement based on a particular laboratory's workflow. Matings have their own strain, which may be different from the strains of the sire and dams. Each mating produces one or more litters. These litters will become individual mice in the database at weaning/tagging. Each mouse is also associated with its current pen (cage).

Two methods are provided for keeping track of experimental workflow (procedures, tests, routine activities, etc.) that may be scheduled. 1. The simple method is called **Mouse uses** and provides a method of assigning various "uses", proposed dates, and simple data results to individual mice. 2. The more comprehensive method is called **Experimental plans**. This section of JCMS provides a method of defining experimental plans. Each plan contains various user-designed experimental tests, user-designed data fields, default data values, and scheduling information. Individual mice can have experimental data results associated with them and can be scheduled for various experimental tests and various experimental plans. See the section on Experimental Plans for a more comprehensive diagram and description.

Biological samples that are related to mice, matings, litters, or of user-defined origin may be entered. See the section on Sample Tracking for more information.

2 Getting Started

2.1 Quick Start

BEFORE BEGINNING, YOU MUST (1) Create a password for user 'Admin', (2) Create the user 'mtsadmin', and make it a member of the Admins group, (3) Link the tables from the interface database (JCMS.mdb), to the source database (JCMS_db.mdb).

JCMS defines a security hierarchy with three levels of permission: Administrator, Owner, and Secretary. All users of JCMS are assigned into one of these groups. The Administrator (mtsadmin) has the overall responsibility for the database. Owners have direct responsibility for groups of mice, matings, samples, and/or for experimental plans and data. Secretaries are users that have only limited security access to the database and normally are restricted to entering data, executing queries, and viewing reports.

2.1.1 Administrator

One individual must be assigned to be the database Administrator (mtsadmin). The Administrator will be responsible for the installation and setup of the database and for creating other user accounts. The Administrator has full access to all data. The Administrator is not expected to be an IT professional, but they may need assistance from their IT department to do a networked installation.

The Administrator must complete the Installation and Administrator Setup sections of this manual before other users may begin. The other users are divided into two groups: Owners and Secretaries.

2.1.2 Regular Users: Owners and Secretaries

Users have restrictions within the database depending on their security level. The Administrator (see above) has full access to the data and forms. Owners have access only to forms at the "owner" or "secretary" security level. These include the ability to enter and edit the mice, matings, samples, experimental plans, and experimental data that they "own".

A secretary is a user who has only limited security access to the database and is restricted to forms at the "secretary" level. Secretaries usually do not have the authority to make changes to data. This type of user may request reports and run queries. They are assigned to certain owners and are not able to perform work for other owners.

It is possible for a user to be both an owner of their own mice and to act as the "secretary" for one or more other owners.

To get started, first the Administrator will provide a new user with either an owner or secretary logon. Then begin with the User Setup and Basics on Using JCMS sections.

2.2 Installation

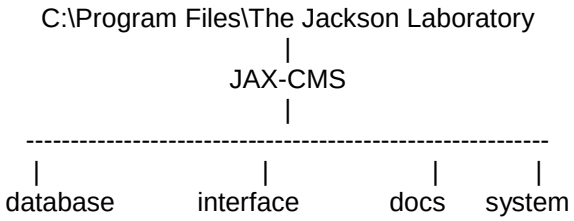
2.2.1 System Requirements

- Single user
  - PC computer with a Microsoft Office 2000, 2003, or 2007 version that includes Microsoft Access 2000, 2003, or 2007 installed on it.
  - Disk space requirements are minimal; 100 MB should be plenty to get started.
  - Memory requirements are minimal; however, large amounts of RAM will boost performance when JCMS has large amounts of data in it.
  - Bar Code 128 from Elfring Fonts Inc. www.barcodingfonts.com is required only if using the optional bar codes on cage cards.
- Multi-user
  - A file server computer running a Microsoft Office 2000, 2003, or 2007 version that includes Microsoft Access 2000, 2003, or 2007.

- A network environment set up so that all client computers can access the file server.
- PC computers, Macintosh computers, wireless handheld computers and UNIX/LINUX computers may act as clients if supported by the network software.
- It is recommended that network thin client software such as Citrix® Metaframe Client/Server be used if computers other than PCs are used.
- Disk space requirements are minimal; 100 MB should be plenty to get started.
- Memory requirements are minimal; however, large amounts of RAM will boost performance when JCMS has large amounts of data in it.
- Bar Code 128 with a site license from Elfring Fonts Inc. www.barcodingfonts.com is required only if using the optional bar codes on cage cards.

2.2.2 Download the JCMS Files

Download from the Jackson Laboratory Web site the Windows installer file **JAX-CMS-2003.msi** and place it on the desktop. Double click the file to run it. It will ask you to specify an installation folder. The default is C:\Program Files\The Jackson Laboratory. Within this, the folders \database, \interface, \docs, and \system are created (see diagram).



The following files are included in the folder named *JAX-CMS*:

- docs
  - ReadMe.html
  - JAX-CMS_UserGuide.doc
  - JAX-CMS_ReleaseNotes.txt
  - License.txt
- database
  - JCMS_db.mdb
- interface
  - JCMS.mdb

2.2.3 Required configuration steps

BEFORE BEGINNING, YOU MUST (1) Create a password for user 'Admin', (2) Create the user 'mtsadmin', and make it a member of the Admins group, (3) Link the tables from the interface database (JCMS.mdb), to the source database (JCMS_db.mdb).

2.2.4 ReadMe Files

We suggest you first read the files **ReadMe.html** and **JAX-CMS_ReleaseNotes.txt**. These should contain up-to-date information on changes not included in this documentation. Also subscribe to the mailing list by sending an email to: **jaxcms-subscribe@lists.jax.org**. No subject or email body is required.

2.2.5 Initialize Passwords for MS Access

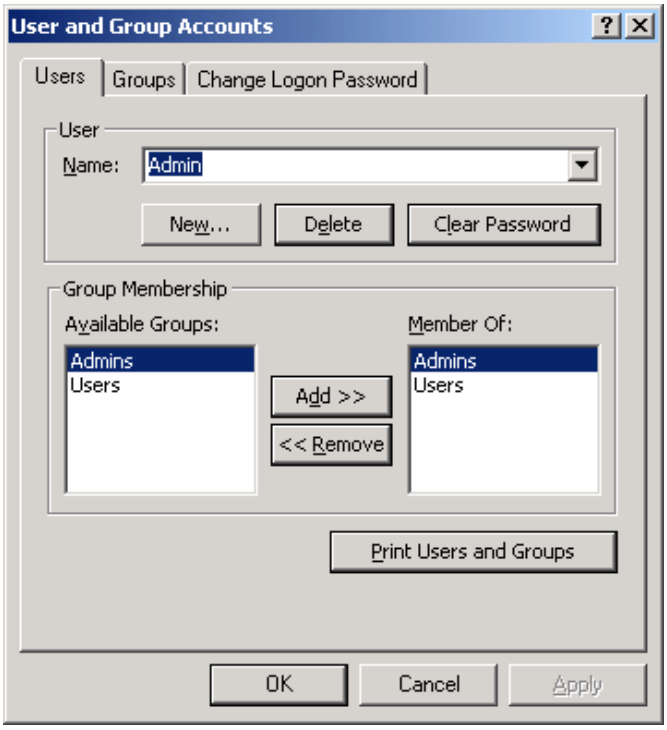


Figure 2-1 Dialog Box: User and Group Accounts

Solutions to some minor problems that may occur are given at the end of this section (see the additional configuration issues section.) If the version of MS Access in use has password protection already set up, skip down to the step setup the Administrator logon.

- **Hold down the shift key** on the keyboard and double click the JCMS shortcut icon.
    - MS Access should open up and the database window and main menu bars will be available.
- By default, MS Access will have logged in as the Admin user with no password.
- Select on the menu bar Tools/Security/User and Group Accounts.
- Select the *Change Logon Password* tab.
- Create a password for the Admin user and close MS Access.

2.2.6 Setup the Administrator Logon

- Restart MS Access by double clicking the JCMS shortcut icon.
- Log on as user Admin with the new or existing password.
    - Hold down the shift key as JCMS starts up.

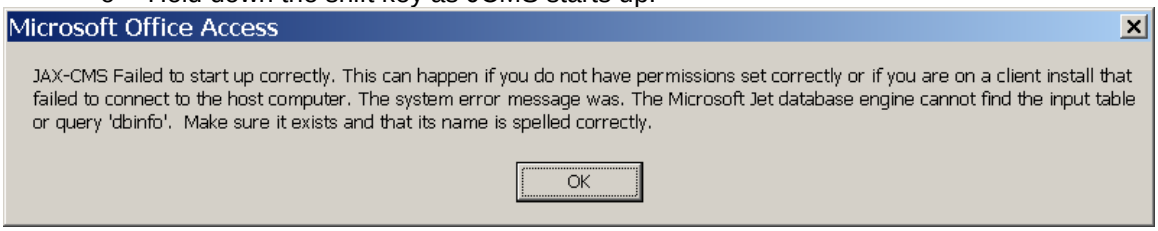


Figure 2-2 Error: Failed to Start up Correctly

- The error message above or something similar may display. This message indicates that the database tables need to be re-linked. The re-linking step will be completed after a few more steps, so for now, ignore this message.
- Select on the menu bar Tools/Security/User and Group Accounts.
- Create a new user called mtsadmin. For the Personal ID, enter a string of characters of your choice. You do not need to remember this information for JCMS, however if you'd like to learn more about Personal ID and User Level security, visit the Microsoft Access database Web site.
- Add user mtsadmin to the *Admins* and *Users* groups
- Close MS Access.
- Restart JCMS and login as mtsadmin while holding the shift key down.
    - Now give mtsadmin a password using the same procedure as described above to give the Admin user a password. This is not required, but it is very strongly encouraged.

2.2.7 Configure some Database Options

- Select Tools/options then the Edit/Find tab. Make sure the Confirm options are all un-checked as in the picture below.

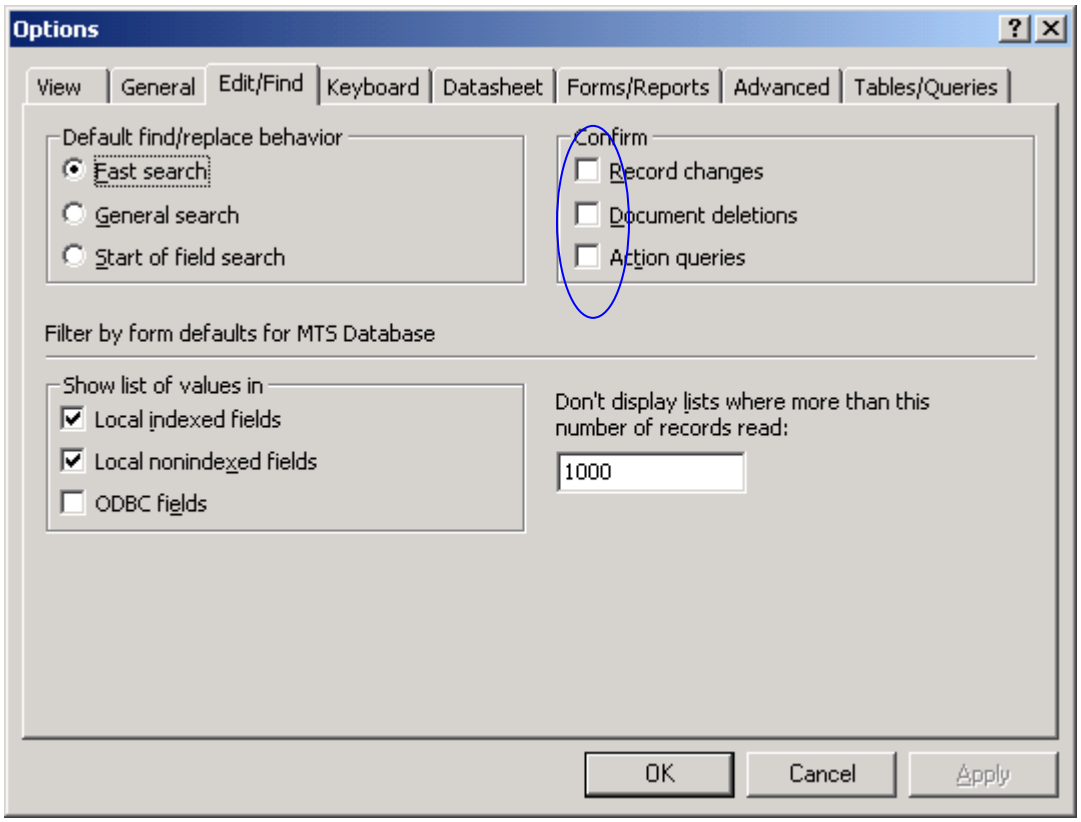


Figure 2-3 Confirm Options

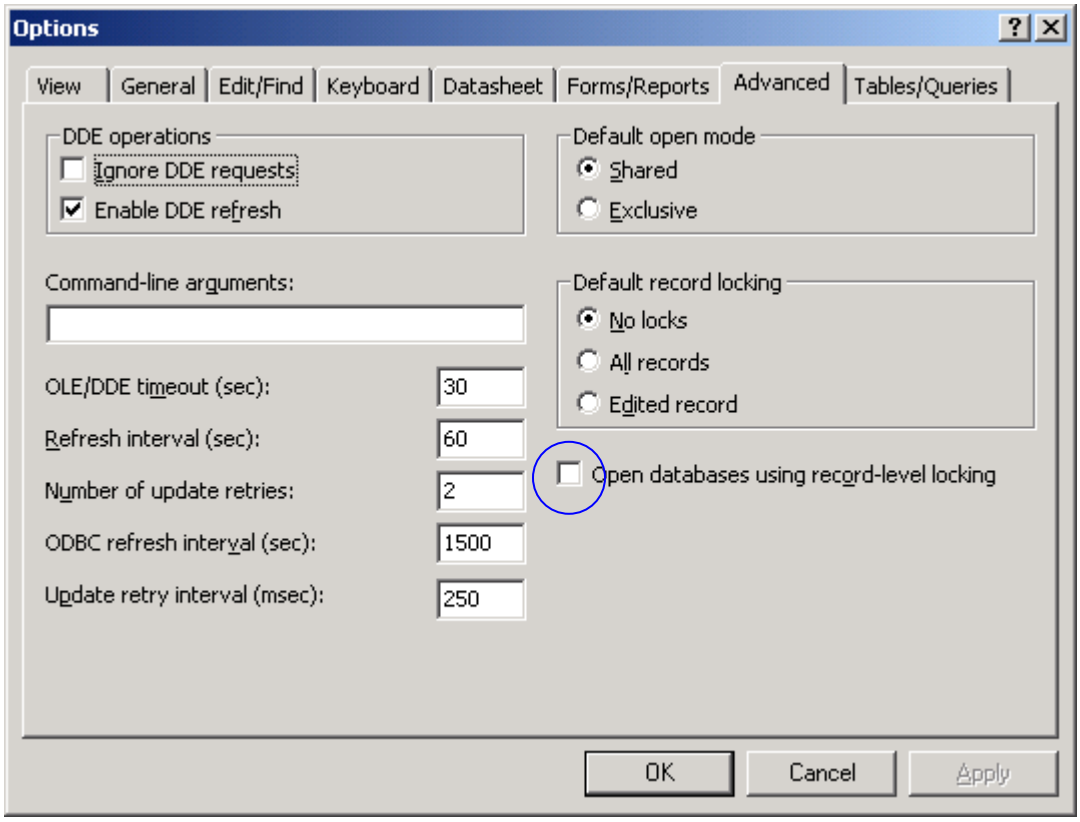


Figure 2-4 More Options

- Next select the Advanced tab. Make sure the check box that says "open database with record-level locking" is UNCHECKED. IF THIS FIELD IS LEFT CHECKED, THE ADD LITTER WITH PUPS FORM WILL NOT WORK (see picture above). Click OK.

2.2.8 Link the Database Tables

The current shipping version of JCMS does not contain links to the tables in the interface (JCMS.mdb). Directions were given in the file named **ReadMe.html** on how to initially set up the linked tables. They are repeated below.

2.2.9 Initially Link the Database Tables

- Bring up the database window by pressing the **F11** key.
- Select **Tables** from the left hand '**Objects**' column by clicking on it.
- Right click the mouse on Tables and select '**Link Tables…**'.
- Navigate to *JCMS_db.mdb* in the database folder.
- '**Select All**' the tables and click '**OK**'
- Close *JCMS.mdb* and re-open it. Do not hold down the shift key, this no longer necessary. The welcome window should appear as shown below. The installation is now ready to be used.

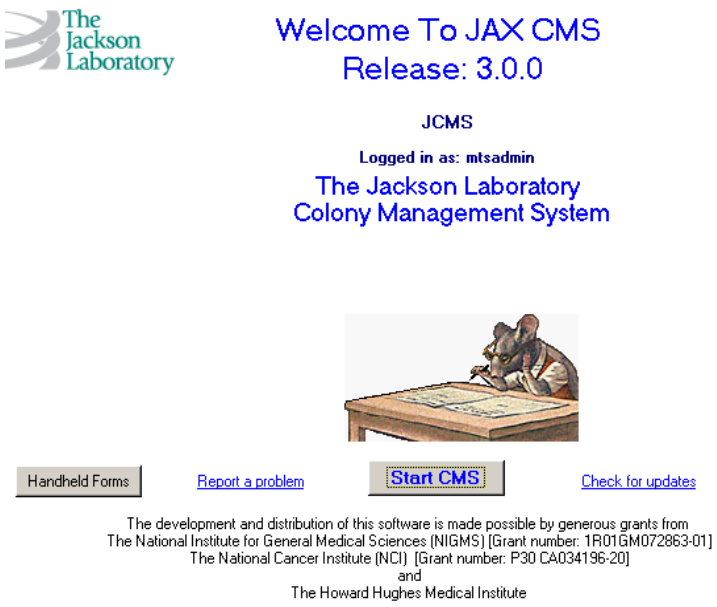


Figure 2-5 Form: Welcome Screen

2.2.10 Installing a Client (Multi-User Environment)

JCMS is designed to be used by many people simultaneously (multi-user). To implement this, the database is placed on a computer (server) that all users may access. A copy of the interface may be placed on each user's computer (client) and the tables are then linked to the database.

However, we recommend that both the JMCS_db.mdb (database) and JCMS.mdb (interface) files sit on one central machine (server). Each user's computer (client) will have a shortcut on the desktop that invokes the JCMS.mdb file through a share folder over the network. That way you don't have multiple copies of the JCMS.mdb file to maintain. The "best" way to access share folders from clients is by using Uniform Naming Convention (UNC) instead of direct paths with drive letters. Thus if your machine is named *goofy* and the share folder is named *JAX-CMS* then the UNC would be

\\goofy\JAX-CMS

The standard installation location for the JCMS.mdb file is
C:\Program Files\The Jackson Laboratory\JAX-CMS\interface
and for the JCMS_db.mdb file
C:\Program Files\The Jackson Laboratory\JAX-CMS\database

If you've installed it somewhere else, that's okay, you will just need to adjust your paths accordingly.

Also, let's assume that you have a copy of the system.mdw file in the JAX-CMS folder and it is named JCMS.mdw. You, of course, can put the mdw file anywhere and name it anything you like.

Assuming you've installed everything in the standard spot and you've made JAX-CMS the shared folder, then the next thing to do is create a shortcut that invokes the JCMS.mdw interface file. This is easy, first create the shortcut (we'll assume you can do that). Open the shortcut properties by right clicking your mouse on the shortcut and select properties. Now just edit the shortcut properties so that the target string in your shortcut will look like this

Target = "C:\Program Files\Microsoft Office\OFFICE11\MSACCESS.EXE" "\\goofy\JAX-CMS\interface\JCMS.mdb" /wrkgrp "\\goofy\JAX-CMS\JCMS.mdw"

Now just put a copy of the shortcut on any client's desktop.

Notes:

- The client machine must have MS Access installed on it.
- Error message: JCMS Failed to start up correctly. If you move the location of the database, the tables will normally have to be relinked in the interface following the directions above. The interface (JCMS.mdb) will always have to be told where the database tables (JCMS_be.mdb) are located.
- For more information on the system.mdw file see the configuration section below.

2.2.11 Installing the Bar Code 128 Font

JCMS offers optional bar codes on cage cards. To use this feature, Bar Code 128 with a site license from Elfring Fonts Inc. www.barcodingfonts.com will need to be installed on any clients that print cage cards or read bar codes. Follow the manufacturer's installation instructions.

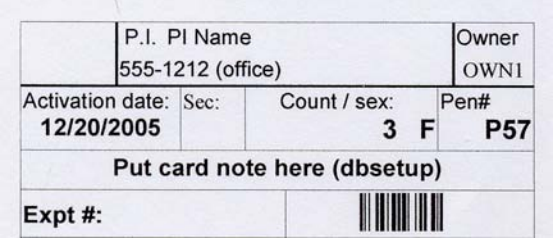


Figure 2-6 Sample of a bar code for the pen ID number

2.2.12 Additional Configuration Issues and Answers to Common Problems

The above procedure assumes that MS Access is configured in the most common way. Occasionally there are some odd behaviors that may be addressed below.

2.2.12.1 **File MSCOMCT2.OCX is missing**

2.2.12.2 **File MSCOMCTL.OCX is missing**

2.2.12.3 **File MSFLXGRD.OCX is missing**

Some versions of MS Access do not have a necessary Windows file installed. The installer should have installed these files for you. If one of these messages occurs, close MS Access. Download the file from the Microsoft Web site and follow their directions to install it.

2.2.12.4 **When JCMS is started it states the client is not compatible with the current database.**

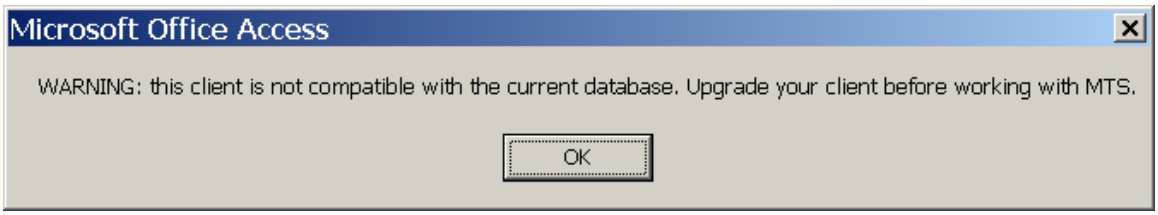


Figure 2-7 Error: This client is not compatible with the current database

This message indicates that the linked database tables are for a different version of JCMS. Use Tools – Database Utilities – Linked table manager to see what path has been specified for the database tables. They may need to be updated for this client. The Dbinfo table has release information in it. It indicates what version of the database the tables are for in the field named Database Release Number.

2.2.12.5 **No tables are listed by the Linked Table Manager**

There are two different versions of this problem.

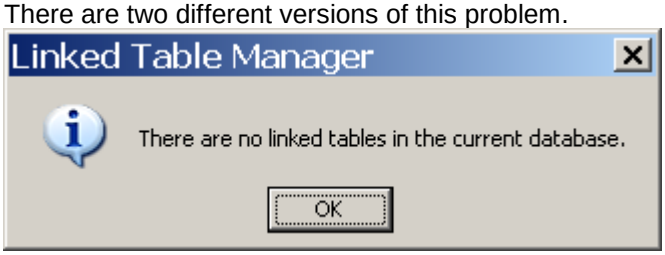


Figure 2-8 Error: No Linked Tables Message

The current shipping version of JCMS does not contain links to the tables in the interface (JCMS.mdb). Follow the directions given in the file named **ReadMe.html** for directions on how to initially set up the linked tables.

Once the tables are linked in the interface, a Microsoft bug sometimes causes the tables to not display in the Linked Table Manager. The image below will show no list of tables.

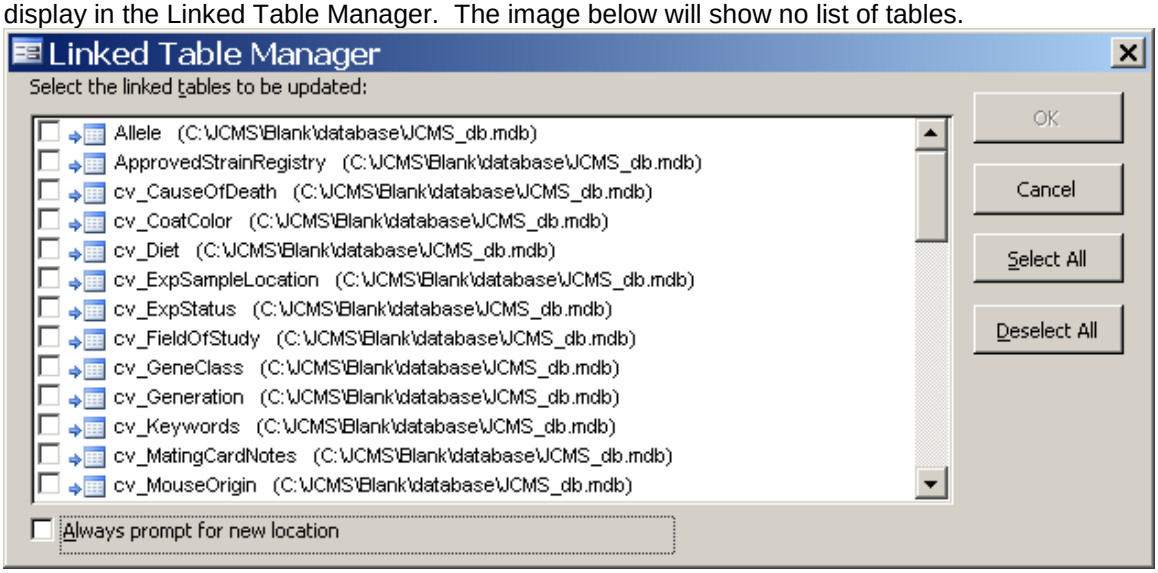


Figure 2-9 Error: Linked Table Manager Blank

This problem occurs only for Access 2003 users. The computer probably previously had Access 2000 or has both versions of Access installed on it. This problem does not seem to occur if Access 2000 was completely removed before Access 2003 was installed.

Microsoft has acknowledged the problem is a bug. There is a white paper out on this issue at: http://support.microsoft.com/default.aspx?scid=kb;en-us;835519

Or search the Microsoft Knowledge Base for article 835519.

Summary: MS Access 2003 is using the wrong version of a file known as ACCWIZ.DLL
Solution:

- Search the computer for the file name ACCWIZ.DLL, there probably is more than one. Right click each file found and look at the properties. The correct file will have a version number similar to 11.x.xxxx.x.

- Now register the correct file by using the following command at the command prompt:
    - regsvr32.exe <*path*>\Accwiz.dll
      where *path* is the full path to this file.

    - The standard the path for this file is:
      "C:\Program Files\Microsoft Office\OFFICE11\ACCWIZ.DLL"
      It is necessary to put the quotes around the path name only if there are spaces in it.

    - Example:
      Click Start, and then Run…
      Enter into the Open box:
      regsvr32.exe "C:\Program Files\Microsoft Office\OFFICE11\ACCWIZ.DLL"
      Click OK.

2.2.12.6 **The MS Access menu bar has virtually no options on it**.

- MS Access has an option that allows menus (such as the tools menu) to be displayed or not. If the menu bar shows only the bare minimum of buttons, then enable full-menus as follows:
    - Close JCMS (if it isn't already)
    - Start JCMS and hold down the shift key as it is starting up. A full set of menu options should now appear.
    - Go to the Tools/Startup menu option and check the box that says *allow full menus.*

2.2.12.7 **How to avoid setting up users on each client.**

When the Administrator creates new users in MS Access, this information is stored in a file called **system.mdw** on the local computer (client). So, every time a client computer is added, the Administrator has to set up mtsadmin and the users again in the system.mdw file on the new machine. MS Access does provide a method of avoiding repeating this setup. The database must use a special workgroup file instead of the default system.mdw. This file is set up once on the file server and contains all the users' MS Access logons. The Administrator can set up a new user from any machine and only has to do it once. When MS Access is started, it must "know" to use the special workgroup file. There are several ways of implementing this depending on the version of MS Access and if other MS Access applications are in use.

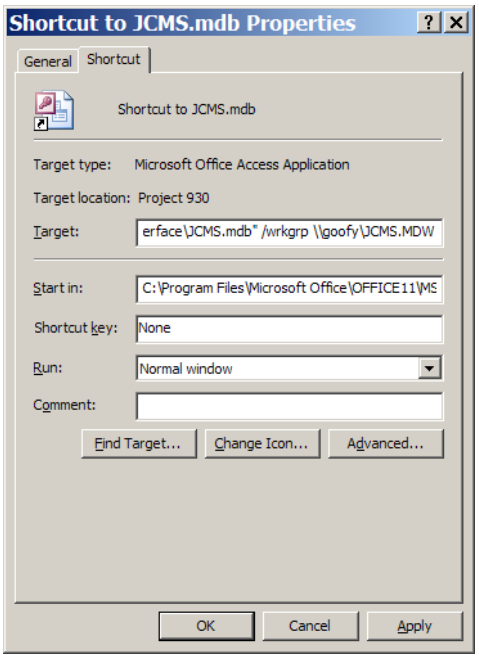


Figure 2-10 JCMS.mdw Shortcut

- Method A: Recommended method especially if other MS Access applications are in use.
    - Use a command line switch that gives the path to the special system.mdw file. MS Access will use the special file only when opening this application.
    - First create the JCMS.MDW file as described above.
    - Modify the client desktop shortcut by right-clicking it and selecting Properties. Select the Shortcut tab and set the Target to:

"C:\Program<*space*>Files\Microsoft<*space*>Office\OFFICE11\MSACCESS.EXE"<*space*>
"C:\ JAX-CMS\interface\JCMS.mdb"
<*space*>/wrkgrp<*space*>
"*fileserverpath*\JCMS.MDW"

    - The above example of the target contains 4 parts separated from each other in the text string by a single <*space*> where indicated.
        - The path to the MS Access program

        - The path to the interface software on the client computer
        - A command line switch indicating to use the special workgroup file (/wrkgrp)
        - The path to the workgroup file on the file server. Replace *fileserverpath* with the specific path for this installation.
- Method B: If the only MS Access application to be run on the client is this application.
    - Then MS Access can be told to always use the special workgroup file on the server.
    - **MS Access 2003 method**:
        - With MS Access 2003 running, change what system.mdw file is in use by "joining" a different workgroup. On the tools menu select Security – Workgroup Administrator. The dialog box will show where the system.mdw file now in use is located.

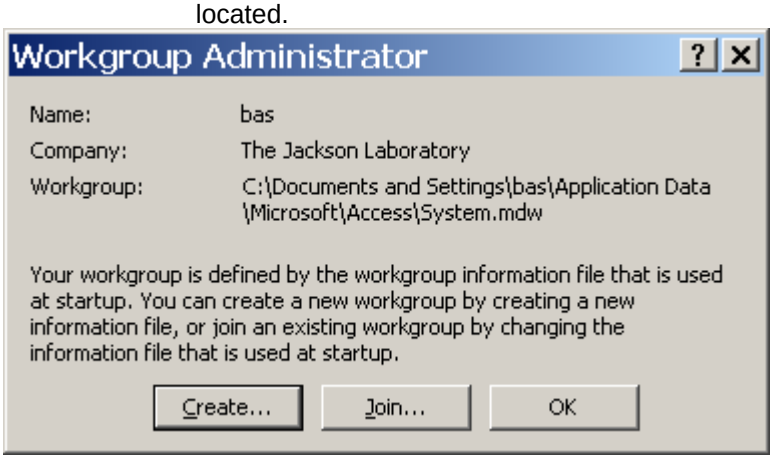


Figure 2-11 Dialog Box: Workgroup Administrator

        - If no special system.mdw file exists yet, create a new one named JCMS.MDW and place it into the JAX-CMS folder on the file server.
        - Then use the Join button to make that the startup workgroup file.
        - Note: this will generate an error message when starting MS Access if the file server computer is not available over the network. Therefore, this method should not be used if that client machine is running other MS Access applications.
    - **MS Access 2000 method**:
        - A special program is used to create and join workgroups. This must be run when MS Access is not running. The program is named WRKGADM.EXE, it is usually in the C:\Program Files\Microsoft Office\Access 2000\Office\<*language id*> folder. On US English installations 1033 is the *language id*. It works the same as the Workgroup Administrator described above.

3 Administrator Setup

Before initializing the controlled value tables, the JAX-CMS User Startup form should be circulated among all the potential users for input about the necessary table values. This form is named JAX-CMSUserStartupForm.doc and is included in the documents that were downloaded into the docs folder.

JCMS uses the login name **mtsadmin** as the database Administrator. Anyone accessing JCMS as mtsadmin can perform Administrator functions in JCMS.

3.1 Owner and Secretary Accounts

JCMS uses a very simple user account system. There are two rules to know.

1) Every user of JCMS must have a login to MS Access.

2) Each login name that JCMS uses must be defined as either an owner (of mice) or a secretary. The login name and the JCMS owner/secretary names must be identical. To add owners and secretaries you must be logged in as mtsadmin.

3.1.1 Rule 1: Every User of JCMS must have a Login to MS Access.

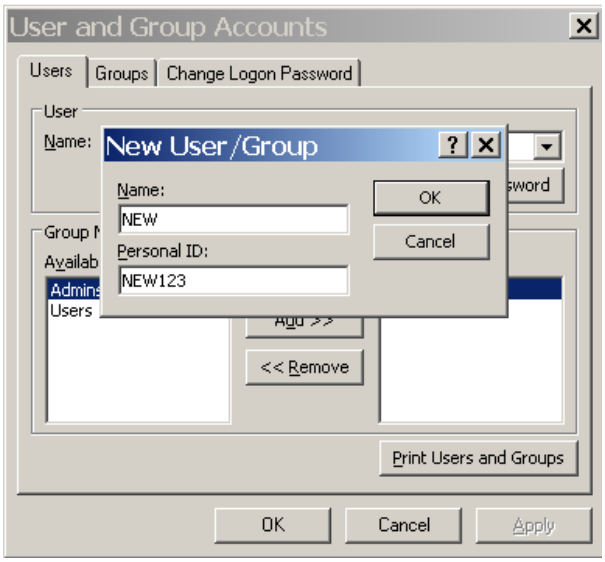


Figure 3-1 Dialog Box: Personal ID

An Administrator (user *Admin* or *mtsadmin*) can set up new MS Access login accounts for starting MS Access. Setting up new MS Access accounts is not a JCMS function; it is an MS Access function. JCMS uses the login name of the user to determine if the user is an owner, secretary, or Administrator (mtsadmin.)

3.1.1.1 **How to Add a New User Logon.**

With MS Access running go to the *tools/security/user and group accounts* menu to add the new users.

Note: the personal ID (PID) is not used by JCMS at this point. It is recommended to use the login name also for the personal ID and add numbers as necessary to make it long enough. Keep all login names short with no spaces, commas, semicolons, or quotes in them; this is especially important for mouse owners since owner login IDs are stored with each mouse. Do not make owners and secretaries' part of the Admins group; they are part of the Users group by default. Users can later set their own passwords by logging into MS Access and setting the password from this same tools/security menu. When a user is first added, his/her password is blank.

3.1.2 Rule 2: Each login name that JCMS uses must be defined as either an owner (of mice) or a secretary.

This rule applies to owners and secretaries. User mtsadmin is neither an owner nor a secretary. The Administrator needs to tell JCMS if the user is an owner or a secretary or both. Owners own mice, matings, experimental plans, and experimental data. Secretaries are associated with one or more owners and have limited edit access to their associated owner's data. NOTE: Owners can be secretaries of other owners and thus have limited editing capability for other owners.

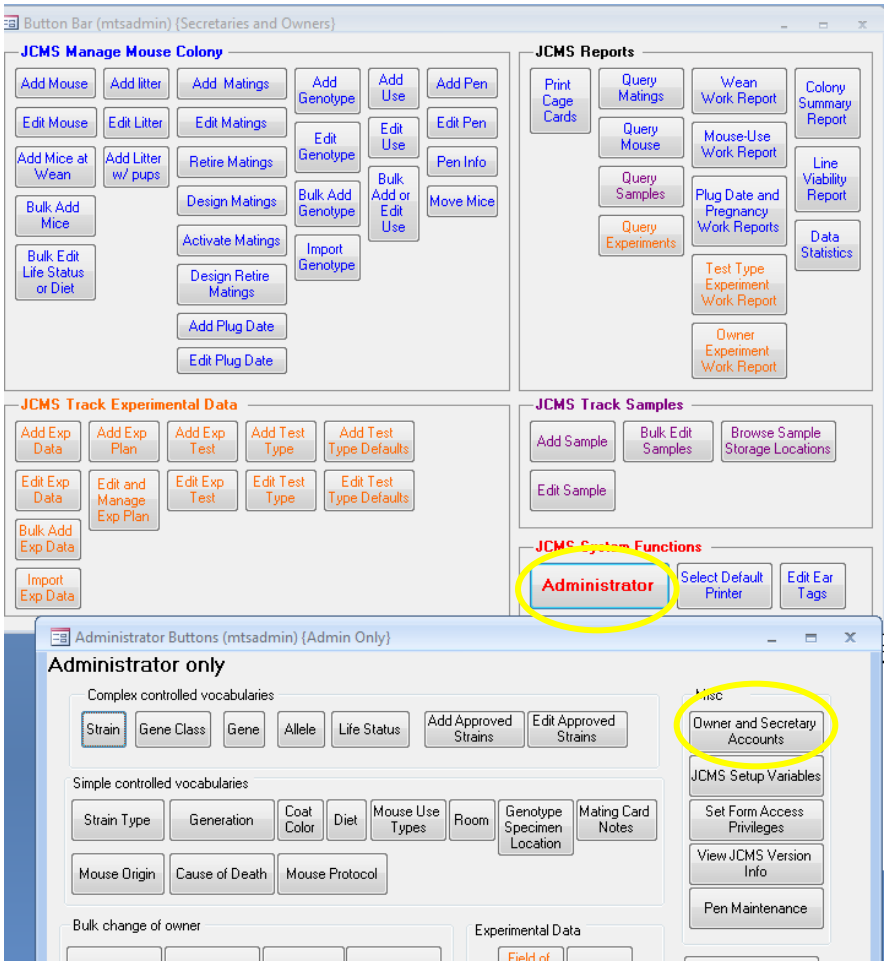


Figure 3-2 Form: Administrator Buttons

To set up a user (other than mtsadmin) as an owner or secretary, open JCMS. Open the Administrator button bar from the main button bar and select the button labeled *Owner and Secretary Accounts*. From this account maintenance form owners and secretaries can be added or deleted (see example below.)

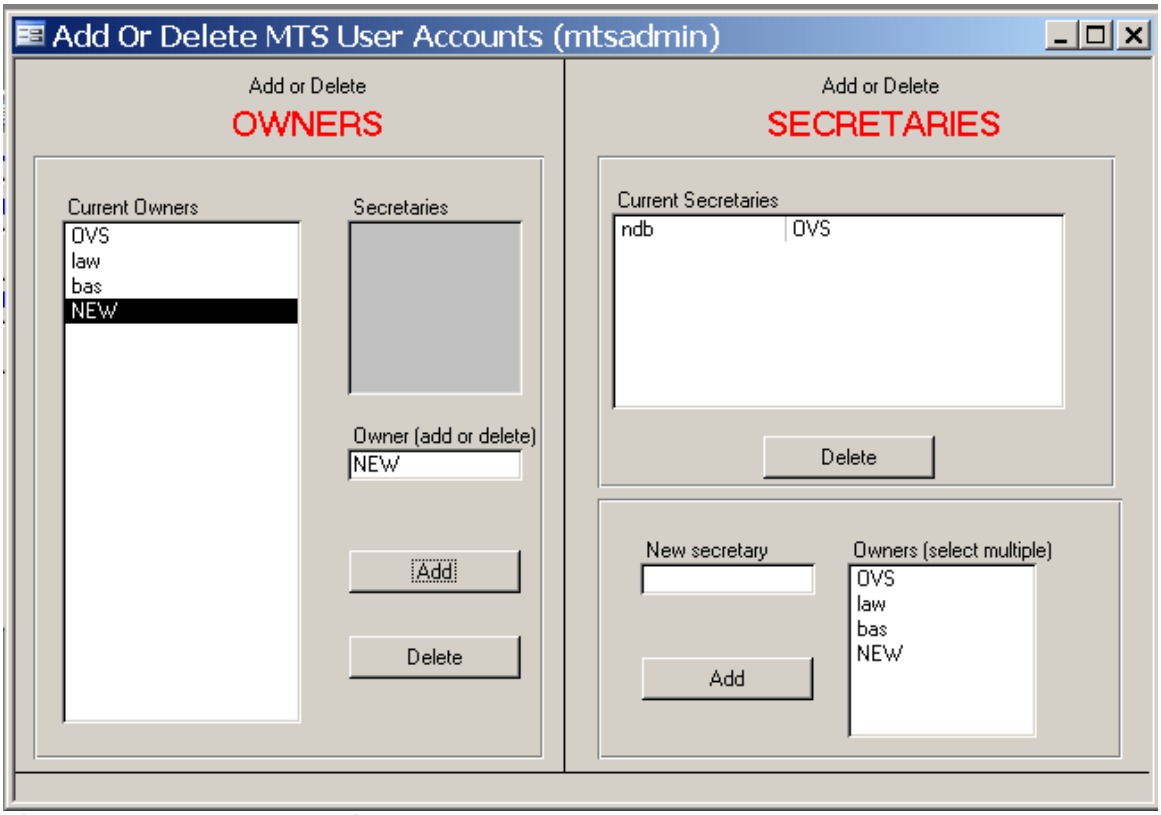


Figure 3-3 Form: Owner and Secretary Accounts

NOTE: the names entered in this form must agree exactly with the names used for logging in to JCMS. NOTE also, do not delete owners that have mice in JCMS as their mice will no longer be accessible (unless you add the owner back using this form). Bulk changes of the owner of mice, matings, samples, and experimental plans may be done using the buttons provided on the Administrator button bar.

3.2 Changing the Forms Used by Secretaries and Owners

JCMS allows the Administrator to configure access to the forms in the interface by the type of user. For example, secretary users may be set up to only use certain add forms and none of the edit forms. Note that some forms are required by JCMS to be available to all users or only to the Administrator. A new installation of JCMS will have all the forms set to a default access level.

To change the access or “privilege” level for one or more forms, use the Set Form Access Privileges button on the Administrator button bar.

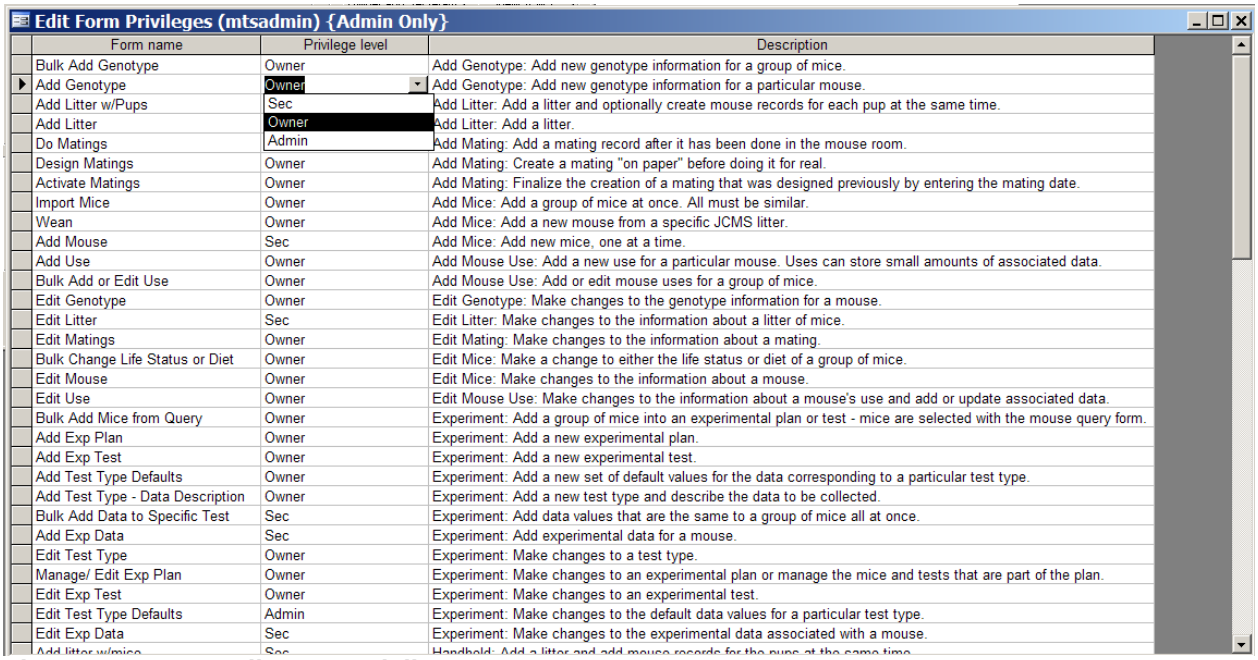


Figure 3-4 Form: Edit Form Privileges

All forms listed may have the access privilege level changed to secretary (Sec), owner (Owner), or Administrator (Admin). The Administrator may use any form; owner level forms are restricted to only owners or the Administrator; secretary level forms may be used by secretaries, owners, and the Administrator. Changes to the access privilege level for a form will take effect the next time JCMS is started.

3.3 Initializing Controlled Value (CV) Tables

Before any mice can be added into the database, values for certain required fields must be established. These values are kept in a set of tables referred to as the controlled value or CV tables. The form JAX-CMSUserStartupForm.doc is provided in the docs folder to help determine the values for some of these tables. A few of the very simplest controlled vocabularies are stored in the user interface forms instead of in tables and cannot be changed (for example, sex can only be “m”, “f”, or “-“).

Controlled vocabularies are changed from the **Administrator** button bar (see figure above) and may only be changed by the mtsadmin user.

3.3.1 Simple Controlled Value Tables

The **Strain Type, Generation, Coat Color, Diet, Mouse Use Types, Room, Sample Location, Mating Card Notes, Mouse Origin, Cause of Death, Mouse Protocol, Field of Study, and Keywords** buttons each open a table for adding or deleting choices from the lists. These lists of choices appear in pull-down menus on many forms. These simple CV terms should be kept minimal in length since they are copied into the database records.

The following list shows all JCMS simple controlled vocabulary tables.

- Room: list of mouse room names
- Generation: valid mouse generation terms (e.g. F1)
- Diet: list of diets (e.g. 4%)
- Mouse Use Types: list of terms that specify a mouse use (e.g. clinical). These terms are used in the Mouse Usage table.

- Coat Color: list of valid coat color names
- cv_GenotypeSpecimenLocation: specifies where genotype samples are located (e.g. a freezer number)
- Cause Of Death: terms that a user can select to specify why a mouse died
- Mating Card Notes: some mating cards allow notes to be printed on them
- Mouse Origin: list of terms that specify where mice can originate, including the local colony. Every mouse has an origin. When mice are brought in from other institutions, they too should be listed in this table.
- Strain Type: Used in the strain table to specify the type of strain (e.g. congenic)
- Gene Class: List of types of genes (e.g. endogenous, knock out)
- Mouse Protocol: Some institutions need to link mice to protocol numbers
- Field of Study: Used to associate experimental plans with each other
- Keywords: Used to describe an experimental plan and may include keywords used for publication of the results

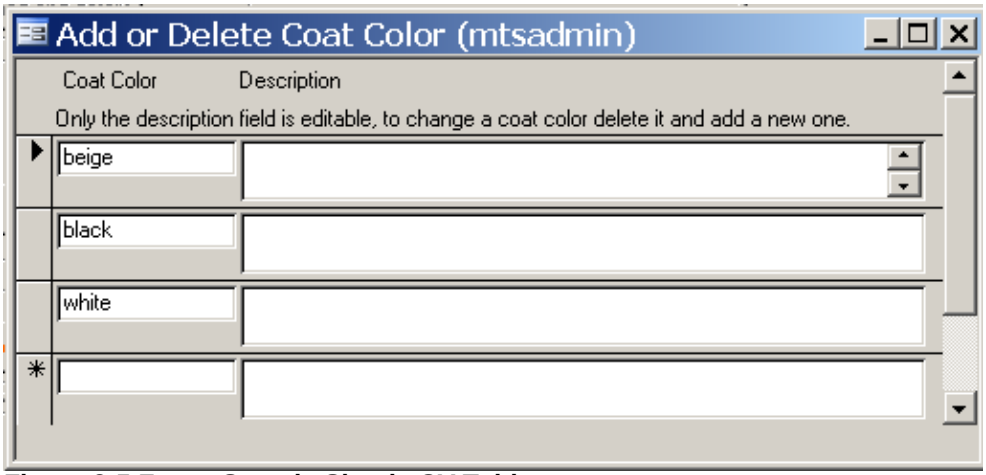


Figure 3-5 Form: Sample Simple CV Table

A value in the simple controlled vocabulary tables cannot be changed, instead add or delete a value. Thus, to change a value in one of the tables, delete it, and then add the value back with the change. Deleting a choice will not remove it from any data records where it has already been used within the database; the choice is simply removed from the list of current possible choices.

For example, at one point room 123 was in use. Now this room is not available but room AB456 is. A number of cages (pen groups) will be moved from room 123 into AB456. Delete room 123 from the room table. Add room AB456 to the table. Use the edit pen group form to change the room from 123 to AB456 for all the cages (pen groups) that are moved. Any retired pens, which used room 123, will not need to be changed. (Nor would you want them to be changed by default – this is why you cannot edit room 123 and change it to AB456 in the room table. Doing that would cause changes to historical data that would not be correct.)

IMPORTANT NOTE: think carefully before deleting (or changing) a controlled vocabulary value if it has already been used. Controlled vocabularies may be used in queries, and thus the ability to find records based on a CV term may be lost if the term is deleted. This could result in a loss of what is known in database terminology as referential integrity, a mortal sin in relational database systems. This means that some data items will reference no longer existing data objects (the deleted CV term) resulting in undefined consequences.

To add a choice to a table, scroll to the bottom of the list. Type the new choice into the blank space at the bottom.

To delete a choice from the table, click on the box at the left side of the row in the table. The whole row will be highlighted. Press the delete key. A dialog box will ask for confirmation that the record should be deleted.

Some of the CV tables have two fields, the choice and a description. This description field may be edited.

DATA CONSTRAINTS on CV terms: CV terms **cannot** contain single or double quote characters. Thus, “Fred’s chair” would be illegal because of the “ and ’ symbols.

The following CV tables also come with some pre-set values that may be deleted or added to.

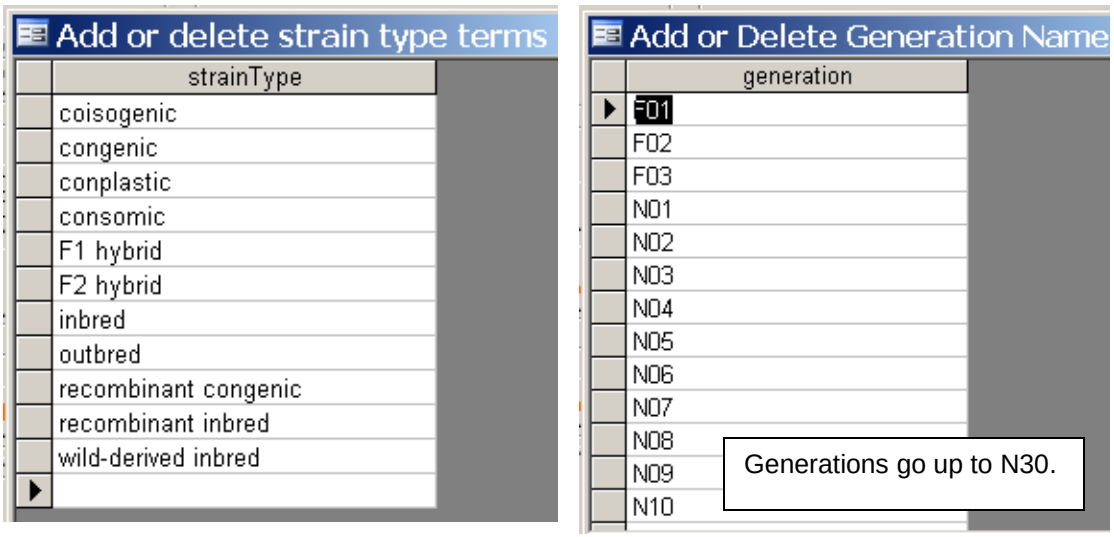


Figure 3-6 Forms: Default Strain Types and Generations

The **Strain, Gene Class, Gene, Allele, and Life Status buttons** open forms that are more complicated than those used for maintaining the simple CV tables described above. These are described in more detail below. **Owner and Secretary Accounts** are described above.

3.3.2 Strain Table

Strain names often use unusual characters to delimit fields in the strain name. Some characters may confuse some of the JCMS displays. It is best to avoid using the following characters in the strain names: quote (“), single quote (‘), and semicolon (;).

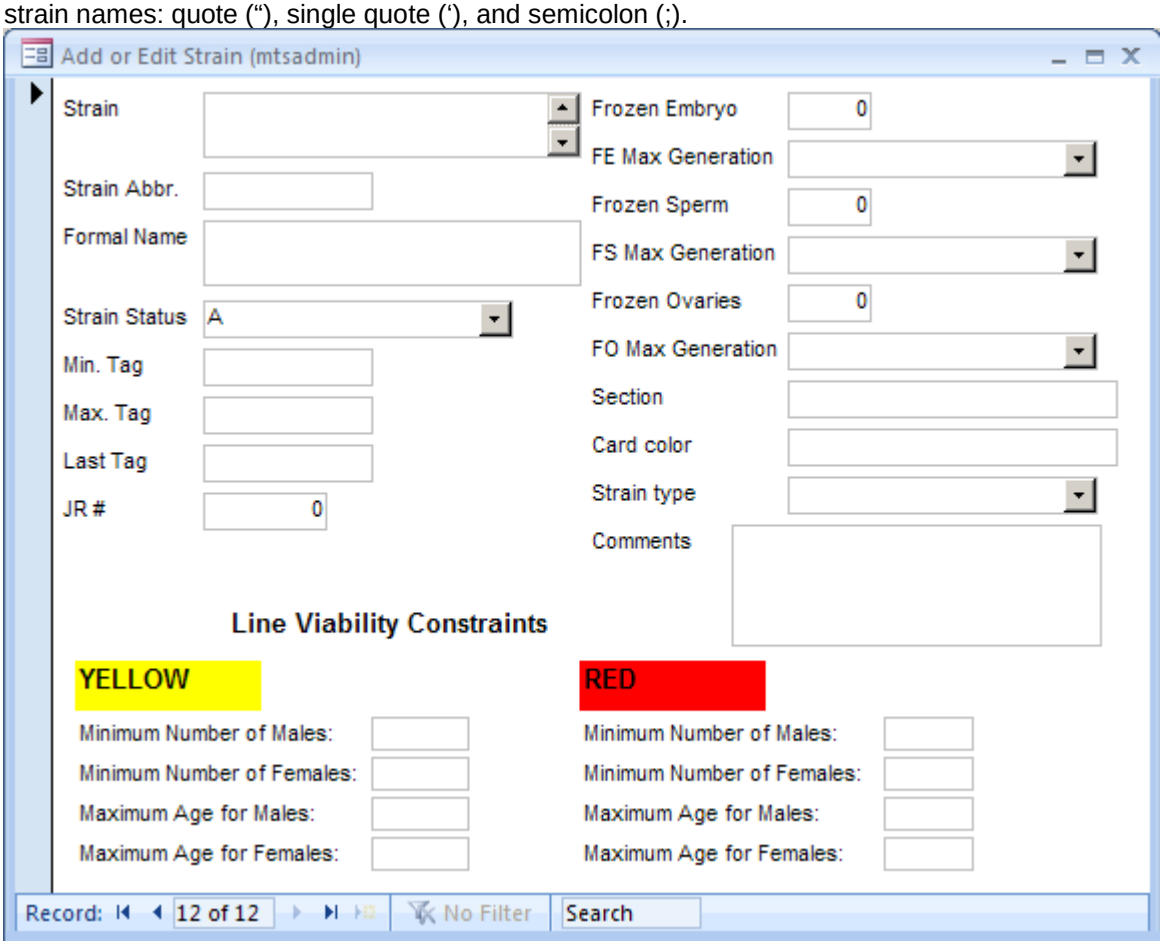


Figure 3-7 Form: Add or Edit Strains

There are three “name” fields in each strain record: Strain, Abbreviation, and Formal Name. Currently, JCMS only uses the “Strain” field. The other two fields can have information added to them for reference purposes, but it will not be used anywhere in the JCMS system.

Use the navigation buttons to move from one strain to another. The strains are listed in alphabetical order. Or click in the strain field and use the find icon (it looks like binoculars) to search for a particular strain. If the exact strain is not known, use the “Match start of field” option.

To **add a strain**, click on ▸* or move to the last record. Only the strain name and status are required. The strain will not be added unless values are entered those fields. Adding will occur when you navigate to another existing record or press ▸* to move to a new record.

To **edit a strain,** type in the field and change it. If a mistake is made, pressing the ESC key once will revert that field back to the original value. Pressing the ESC key twice in a row will revert the whole record back to the original values.

You cannot **delete a strain** from the database unless it is not associated with any matings or mice. If the strain name is incorrect, edit the name. Everywhere in the database where this strain is used, the name will change.

The strain name field contains the name that will appear for all the mice or litters. The strain abbreviation is the shorthand that may be used to refer to this strain within a user group. The formal name is the one assigned by the nomenclature committee. The JR # stands for Jackson Laboratory Resource number. This number is always associated with a particular mouse strain. The strain nomenclature may change over time, but the JR # will remain the same. The JR # may be useful in the future to look up nomenclature changes to the strain name. Additional data is stored about whether or not frozen embryos, sperm, and ovaries are available.

3.3.2.1 Strain table fields

- Strain: name of strain as it will appear on JCMS forms and reports
- Formal Name: formal name of the strain assigned by the nomenclature committee
- Strain Abbr.: a short string abbreviation for the strain name for use in lab only
- Strain status: a controlled vocabulary that specifies how the strain is currently maintained (e.g., frozen, on shelf, etc.)
- Min tag, Max tag, Last tag: specifies ear tag numbers as discussed below
- JR#: the Jackson Laboratory Resource Number
- Frozen Embryo: number of frozen embryos
- FE Max Gen: maximum generation stored as frozen embryo
- Frozen Sperm: quantity of frozen sperm
- FS Max Gen: maximum generation stored as frozen sperm
- Frozen ovaries: number of frozen ovaries
- FO Max Gen: maximum generation stored as frozen ovaries
- Section: section number in the mouse room where this strain is kept
- Card color: color of cage cards used for this strain (displayed on several forms from which cage cards are printed)
- Strain type: from Strain Type controlled vocabulary table, a term that specifies this strain type such as “congenic”
- Comments: free form text
- For *Line Viability Constraints* values, see next section: **Mouse Line Viability**.

3.3.3 Mouse Line Viability

The mouse line viability function provides the colony manager the ability to configure warning levels when the breeders in her colony are:

- approaching a critical age threshold or
- when the numbers of potential breeders have fallen below certain thresholds.

Thresholds are set at the strain level. Therefore the configuration is done by the super user, *mtsadmin*, within the Strain controlled vocabulary function.

The **Strain** configuration function is accessible from the **Administrator** button bar.

There are two levels of thresholds: yellow (warning) and red (dire).

To bring up the report, click on the **Line Viability Report** button on the main button bar.

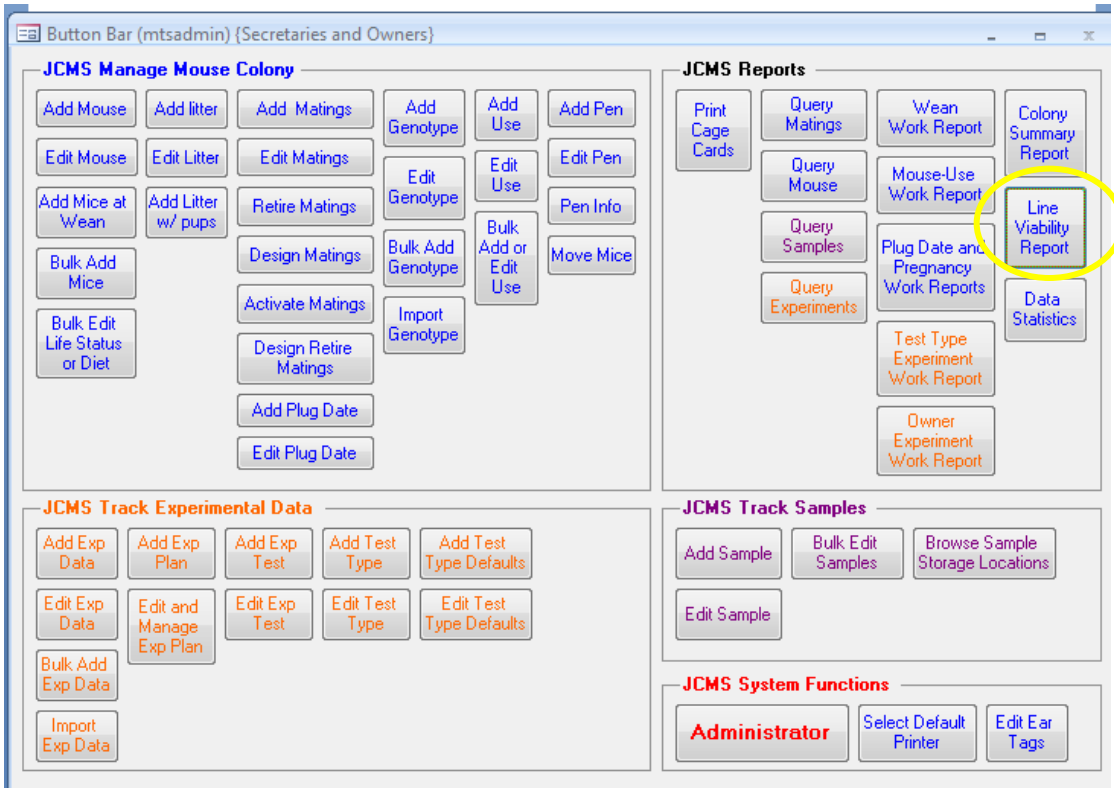


Figure 3-8 Open Mouse Line Viability Report

If you see this message when opening the report, select “No to All”.

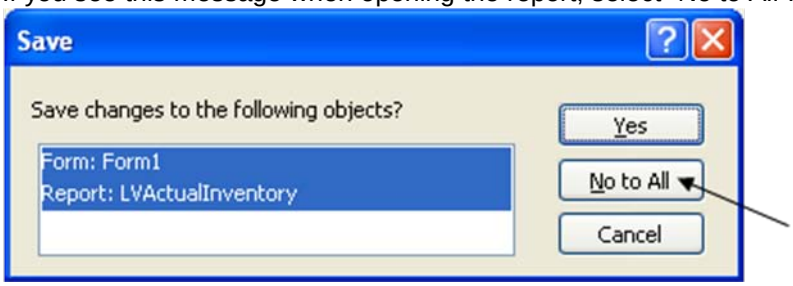


Figure 3-9 Save dialog box

3.3.4 Ear Tag Ranges

If the pups from a particular strain are all given ear tags from a pre-set group of tags, then the ear tag ranges can be used to keep track of which ear tags are used as a function of strain. This range is called the **minimum tag** and **maximum tag**. The **last tag** field is used to record the highest tag number from that range that is currently in use.

To update the ear tag range, use the **Edit Ear Tags button** on the main button bar. To find the correct strain, use the navigation buttons or click in the strain field and use the find icon (it looks like binoculars). If you do not know the exact strain, use the "Match start of field" option.

If a range has been completely used, either blank it out (if no new range has been assigned) or enter the new range, replacing the old one.

All fields in the strain table, with the exception of the Strain, JR#, section, and color fields are simply for user tracking purposes. The four fields that JCMS uses may be printed on cage cards, or will show up in pull down lists.

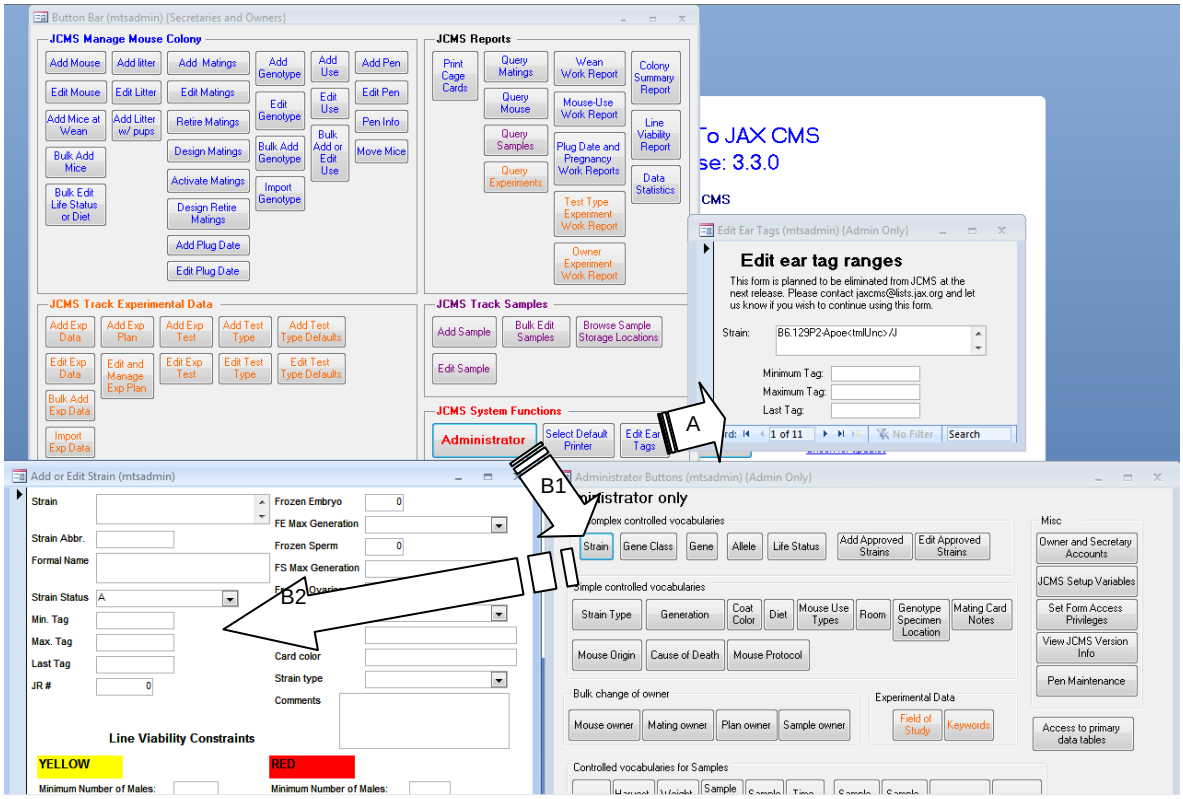


Figure 3-10 Ear tag ranges

There are two places where ear tag ranges may be entered. To eliminate this redundancy, it is proposed to eliminate the Edit Ear Tag ranges form. If this form is important to you, please send a message to jaxcms@lists.jax.org as soon as possible.

Method A: use the edit ear tags button (A) on the main button bar.
Method B: use the Administrator button (B1) on the main button bar and then the Strain button (B2) to open the Edit strain form.

3.3.5 Approved Strains for Litters

The JCMS Administrator will have the ability to create a table of approved litter strains to limit the mating forms to pre-approved strains. This will establish better breeding control and prevent

inadvertent errors. The user is able to override the restriction but only after being warned. The Administrator must set the variable JCMS_ENFORCE_APPROVED_MATINGS in the setup variables to True to implement using approved strains.

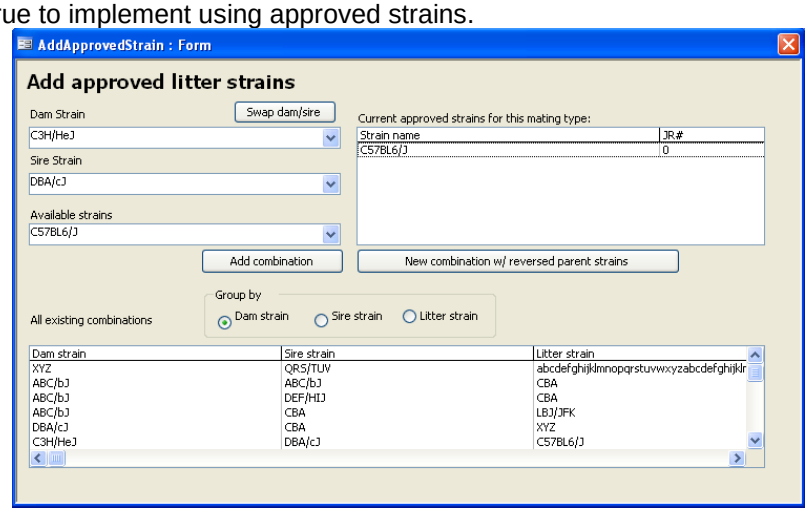


Figure 3-11 Form: Add Approved Strain

An approved litter strain field is a function of the dam strain and the sire strain. A sire strain and dam strain combination is **not** unique. That is, a sire and dam strain combination may result in multiple litter strains. The special case of when the sire and dam strains are the same and will result in that strain will always be 'approved' and need not be entered in the database. Click the **Add combination** button to create a new approved strain.

The **New combination w/ reversed parent strains** button tells the software to reverse the dam and sire strains and create a new record in the database, that is, switch the dam and sire strains but produce the same litter strain. This must be done to make that combination also valid.

The **Swap dam/sire** button is a convenience that will reverse the strains listed in the Dam Strain and Sire Strain boxes.

Approved strain records can be active or inactive. Inactive records are ignored as candidates for litter strains. They are kept in the database for documentation purposes and possible future use.

Use the **Edit Approved Strains** button to make combinations inactive or to delete combinations.

3.3.6 Life Status

The life status controlled vocabulary has three fields. The first field is the lifeStatus field. Use one or two letter entries to specify a life status. The second field gives a description of the life status so users will know which one to select from pull-down menus. The third field, "exitStatus" is a Boolean (true or false) field that specifies if the associated life status implies that the mouse has exited the colony. JCMS uses this Boolean value to enforce rules about whether or not a cause of death or an exit date may be entered. JCMS will prevent entering an exit date if the mouse life status is not an exit status.

The Life Status controlled vocabulary table must include the following pre-set terms in order for JCMS to work correctly.

VOCABULARY TERM	DESCRIPTION	EXIT STATUS?
A	Alive	no
K	Killed	yes

D	Dead	yes
M	Missing	yes
S	Shipped	yes

3.3.7 Gene, Allele and Gene Class Tables

In the database, alleles are associated with specific genes or gene classes. The JCMS forms that display alleles that may be associated with a gene use both criteria (association to the gene and association to the gene class) to come up with a list of alleles that may be associated with a given gene.

Any mouse may have several genotypes. Each genotype consists of a gene and the two alleles that were found for that gene.

3.3.7.1 **Genes**

In order to set up a genotype for a mouse, **first the gene must be entered** into the database.

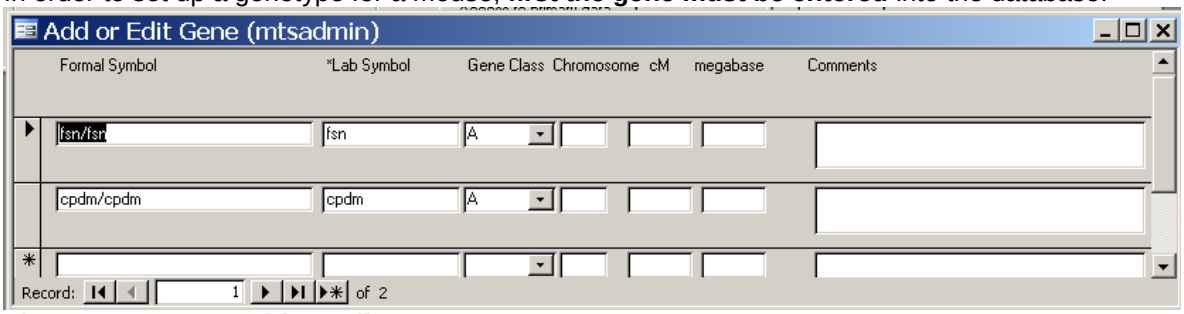


Figure 3-12 Form: Add or Edit Gene

The gene table will be shown as a form. Genes may only be added or edited, not deleted. The field called “Lab symbol” is the gene name that will be used when setting up alleles and genotypes. Gene class is optional. Certain gene classes have been preset. Any new gene classes should be added before the gene is added.

To **add a gene**, scroll to the bottom of the list and enter the new gene into the empty bottom row or use the navigation buttons to move to a new record. The formal symbol and lab symbol are required and the gene will not be added unless values are entered in them. Adding will occur after clicking in a field that is not part of this row.

To **edit a gene,** type in the field to change it. If a mistake is made, pressing the ESC key once will revert that field back to the original value. Pressing the ESC key twice in a row will revert the whole record back to the original values.

A gene cannot be deleted from the database. If the gene name is incorrect, edit the name. Everywhere in the database where this gene is used, the name will change.

3.3.7.2 **Alleles**

Once a gene is added, the list of possible alleles for this gene must be entered into the allele table. Click on the **allele button** on the Administrator button bar to open the add or delete allele form. Alleles may be associated with either a particular *gene* or a particular *gene class*. If an allele is associated with a gene class it will also be associated with all genes of that class. The user can select which association to use by clicking the appropriate radio button in the “Associate allele with” group box.

To associate an allele with a gene, enter the lab gene symbol and the list of alleles already available for this gene will appear. To add another allele to the list, type it into the new allele field

and click the submit button. To remove an allele from the list, check the delete box, type the name of the allele to delete into the “new allele” box, and press the submit button (or double click the allele name in the list box and the name of the allele will appear in the “new allele” box).

To associate an allele with a gene class, click on the “Gene class” radio button and perform the same operations as described above.

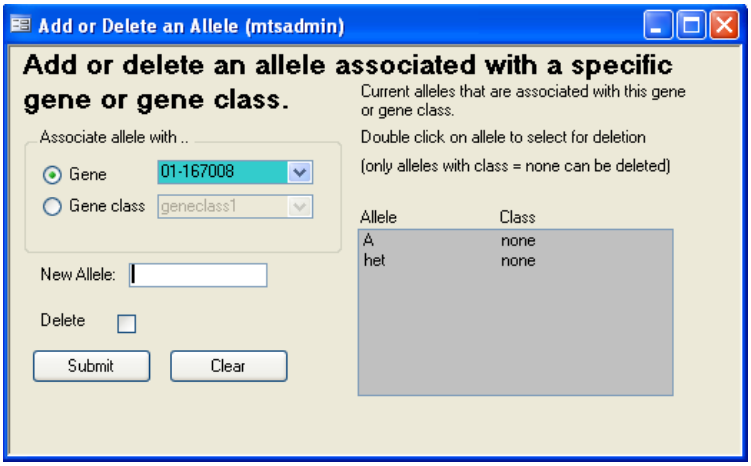


Figure 3-13 Form: Add or Delete an Allele

NOTE: Allele names cannot be edited and an allele that is associated with a gene class cannot be deleted.

NOTE: Since each genotype record links to a record in the gene table, changes to a gene name will be reflected in the genotype records that “point” to the gene. Allele names, on the other hand, are stored directly in each genotype record (not pointed to by a genotype record). Since alleles are treated as simple controlled vocabularies, never change or delete allele records from JCMS (that is, if you ever want to search for mice based on specific alleles).

After the gene and alleles have been entered, this gene can be used for any mouse.

3.3.7.3 **Gene classes**

Gene classes are stored as a controlled vocabulary in a controlled vocabulary table. As with all controlled vocabularies, do not delete or change a gene class term unless there are no records in the database that use that term.

The following Gene Class values are preset.

Class name	*Comments*
E	endogenous
MKO	multi allele knock out
MTG	multi allele transgene
TG	transgene
KO	knock out
KI	knock in
Floxed	tissue specific knock out
CTK	Combination transgene + KO

3.3.7.4 **Generic alleles**

To save time entering alleles, it is possible to create generic alleles that are available for a whole gene class. These alleles will be automatically available as a choice for any gene that is associated with this gene class.

3.4 Setup Variables Table (DbSetup) for Customizing the Installation

JCMS has a setup variables table that allows easy customization of each installation. The Administrator (mtsadmin) can change configuration variables from the **JCMS Setup Variables** button on the Administrator's button bar. **Some of these variables should be initialized; those are marked below in bold print.** The others may be left at the default and changed later once the users are more familiar with the database. See the section on creating custom cage cards for a list and examples of the standard cage card choices.

JCMS Setup Variable name	JCMS Setup Variable value	Description
JCMS_ACTIVATE_MATINGS_INCREMENT	false	Activate Matings autoincrement default
JCMS_ADD_AT_WEAN_INCREMENT	false	Add Mouse at weaning autoincrement default
JCMS_ADD_GENOTYPE_INCREMENT	false	Add Genotype autoincrement default
JCMS_ADD_LITTER_INCREMENT	false	Add Litter autoincrement default
JCMS_ADD_LITTER_PUPS_INCREMENT	false	Add Litter w/ pups autoincrement default
JCMS_ADD_MOUSE_INCREMENT	false	Add Mouse autoincrement default.
JCMS_ADD_MOUSE_USE_INCREMENT	false	Add Mouse Use autoincrement default
JCMS_ALLELE_CONF_HIGH		If blank, nothing is printed when the allele confidence field is checked for a gene (set to true or yes).
JCMS_ALLELE_CONF_LOW	-?	If blank, nothing is printed when the allele confidence field is not checked for a gene (set to false or no).
JCMS_ALLELE_GENE_SEPARATORS	[]	Specify separators to show around the alleles. Ex: Abc[+/-].
JCMS_ALLOW_USERDEFINED_GENERATIONS	false	If true user may add generations to the Generations table on the fly.
JCMS_ALLOW_USERDEFINED_STRAINS	false	If true user may add strains to the Strains table (via the Strains form) on the fly.
JCMS_AUTOINCREMENT_GENERATION	false	If true, the pertinent form has its autoincrement control initialized to checked, else unchecked.
JCMS_CREATE_PEN_INCREMENT	false	Create Pen autoincrement default
JCMS_DATA_FILE_DIRECTORY		The root directory where JCMS data files are stored
JCMS_DESIGN_RETIRE_MATINGS_INCREMENT	false	Design Retire Matings autoincrement default
JCMS_EDIT_LITTER_INCREMENT	false	Edit Litter autoincrement default
JCMS_EDIT_MOUSE_INCREMENT	false	Edit Mouse autoincrement default
JCMS_EDIT_MOUSE_USE_INCREMENT	false	Edit Mouse Use autoincrement default
JCMS_ENABLE_GENOTYPE_IMPORT	true	If true invoke the import process else display error message
JCMS_ENFORCE_APPROVED_MATINGS	false	If true then user is only allowed to set litter strain to pre-approved matings. May be overridden at the form level.
JCMS_EXT_WEAN_TIME	28	A positive integer that indicate the number of days from the birth date to a litter should be weaned in an extended fashion.

JCMS_FEMALES_FIRST	true	When this setting is true females are the first to be weaned. (Add litter w/ pups)
JCMS_GENERATION_INCREMENT_RIGHTMOST	true	Litter ID numeric field to be incremented.
JCMS_IMPORT_EXP_DATA_MICE_MUST_BE_PRESELECTED	true	If false, any mouse IDs not pre-selected will be automatically added to the plan and test.
JCMS_LITTERID_INCREMENT_RIGHTMOST	true	Litter ID numeric field to be incremented.
JCMS_LOOP_LITTER_NUMBERS	true	If true the litter numbers cycle after 10 litters appending a character to the number.
JCMS_MAX_IMPORT_EXP_DATA_ERRORS	10	When maximum is reached verification stops and a report is printed.
JCMS_MOUSEID_INCREMENT_RIGHTMOST	true	Mouse ID numeric field to be incremented.
JCMS_PRINT_EXITED_MICE_ON_CAGE_CARDS	true	Mice with an exit status such as dead, killed, missing, shipped, etc. will print on cage cards.
JCMS_RETIRE_MATINGS_INCREMENT	false	Retire Matings autoincrement default
JCMS_SAMPLE_LABEL_REPORT	PrintSampleLabels	The name of the report used to print sample labels from the Print Sample Label form
JCMS_STANDARD_WEAN_TIME	18	A positive integer that indicate the number of days from the birth date to a litter should be weaned normally.
JCMS_STRAINNAME_FIRST	true	When this setting is true the strain name will appear first (to the left of the JR number) in all the dropdown lists.
JCMS_USE_LITTERID_FIELDWIDTH	4	The number of digits in the numeric portion of the litter id.
JCMS_USE_LITTERID_LEADING_ZEROS	true	If true then we pad the number to the left with leading zeros.
JCMS_USE_MOUSEID_FIELDWIDTH	4	The number of digits in the numeric portion of the mouse id.
JCMS_USE_MOUSEID_LEADING_ZEROS	true	If true then we pad the number to the left with leading zeros.
JCMS_WRITE_FAILED_TRANSACTIONS	false	Currently only used by the sample forms.
MTS_1PEN_WEAN_CAGE_CARD	TS_1PWeanCageCard	The name of the cage card form for 1-pen wean cage cards
MTS_2PEN_WEAN_CAGE_CARD	OS_2PWeanCageCard	The name of the cage card form for 2-pen wean cage cards
MTS_AUTO_COLOR	true	True or False. If true, then many edit forms get all fields colored after user hits submit. Color is cleared after user visits the field
MTS_AUTO_LITTER_NUMS	on	MTS generates litter numbers automatically by default when this is turned on.
MTS_AUTOINCR_DAMS_SIRES	false	The default value of the autoincrement dam/sires checkbox on the trio/pair mating form. (handheld)
MTS_CAGE_CARD_DETAIL_NOTE	Put card note here (dbsetup)	Detail cage cards get this note printed on them
MTS_DEFAULT_AUTO_INCREMENT	off	"On" if you want auto increment to be default on most forms, "Off" makes it not the default.
MTS_DEFAULT_COD		Use this variable to specify the default cause of death. Must match a value in cv_CauseOfDeath table.(handheld forms only)
MTS_DEFAULT_HEALTH_LEVEL	2	Pens have health levels.1 is highest health.This value will be used as the default forms as appropriate.
MTS_DEFAULT_MOUSE_ORIGIN		Default origin for mouse origin pull downs. MUST be a value from the MouseOrigin

		controlled vocabulary table.
MTS_DEFAULT_MOUSE_ROOM		Default mouse room, must be from room table or ""
MTS_DEFAULT_PRINTCARDS	true	Initializes the print cage card option on the trio/pair mating form. If true, checkbox is initialized to 'on'. (handheld forms only)
MTS_DEFAULT_USE_BASEMOUSE_ID	false	Set to "true" if you want to use base mouse id on the handheld add litter form. (handheld forms only)
MTS_DETAIL_CAGE_CARD	TS_DetailCageCard	The name of the cage card form for detail cage cards
MTS_DOB_ROLLBACK_OFFSET	7	Subtract these number of days from today's date to get the date of birth.
MTS_HELP_EMAIL	mailto:jaxcms@lists.jax.org?subject=Support issue	Use this var to specify an email address that users can send mts support questions too
MTS_IMPORT_MAX_WARNING	20	Users will be warnded if they try to import more than this number of mice at once (only effects bulk imports of mice)
MTS_INSTALLATION_NAME	JCMS	Name of this JCMS installation (anything you want to call it)
MTS_LITTER_ID_PREFIX	L	A short string of characters that are prefixed on litter numbers generated by JCMS (not all litter nums are generated by MTS)
MTS_MAIN_BUTTON_BAR	MainButtonBarJCMS	Name of the main button bar form displayed when user hits start JCMS from welcome window
MTS_MATING_CAGE_CARD	OS_MatingCageCard	The name of the cage card form for mating cage cards
MTS_MATING_CAGE_CARD2	TS_MatingCageCardStyle2WithBarCode	The name of the cage card form for mating cage cards - second version
MTS_MATING_ID_PREFIX	M	A short string of characters that are prefixed on mating IDs generated by JCMS
MTS_MAX_MICE_PER_PEN	10	Maximum number of live mice in any pen
MTS_MOUSE_ID_PREFIX	A	A short string of characters that are prefixed on mouse IDs generated by JCMS (not all mouse IDs are generated by MTS)
MTS_NUM_AUTO_LITTER_NUMS	10	this variable sets the number of litter numbers that are assigned to a mating. It should be set to a value bigger than the max number of litters you ever expect. Suggested values are 10 or 100.
MTS_PEN_ID_PREFIX	P	A short string of characters that are prefixed on pen numbers generated by JCMS
MTS_PI_NAME	PI Name	Name of lab PI who owns colonies tracked by JCMS
MTS_PI_PHONE	555-1212 (office)	Phone numbers, printed on mating card
MTS_RELAXED_PEN_NUMS	true	True or False. If true, then JCMS will allow pen numbers to be generated even though a cage card may not be printed with the number on it
MTS_THRESHOLD_MICE_BATCH_OPERATION	50	This variable will trigger a warning from certain actions when the number of affected mice exceeds this value.

3.5 Cage Card Setup

Cage cards are designed to print on a standard index card. The exact cage cards used will vary depending on the setup. Different cage card formats may be selected from the setup variables option on the Administrator's button bar. Enter into the JCMS Setup Variable value the exact name of the cage card report. When cage cards are printed from data entry forms, relevant information (such as mouse ID, strain, etc.) is printed directly on the card.

3.5.1 Printing Cage Cards

Periodically, blank cage cards can be printed to use in the mouse room for newly weaned mice or mice obtained from other sources. Use the **Print Cage Cards button** on the main button bar to open the Print Cage Cards form. Enter the number of cards needed. Any of the four cage card types may be printed as blank cards. JCMS will generate unique pen ID numbers for each card.

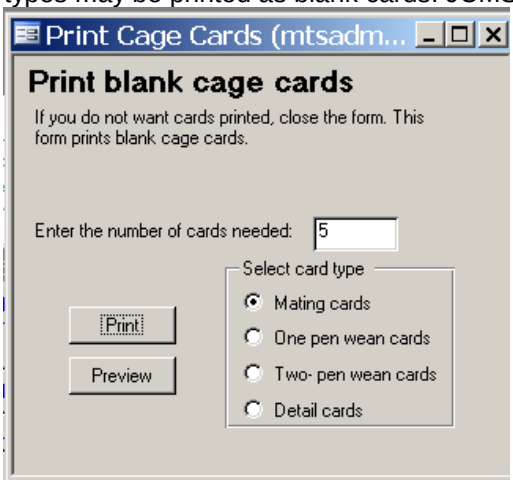


Figure 3-14 Form: Print blank cage cards

The cage cards use the default printer and default paper location. Many modern printers will use the sheet feeder as the default whenever there is paper in the sheet feeder. To print cage cards, open the sheet feeder and load the cards into the envelope feeder part of it. Also set the printer to use as straight a paper path as possible. Many printers have an option for sending sheets out the back if it is open or have a toggle switch to change the path. The cage cards are designed to print centered on the paper. Adjust the envelope feeder to place the cards in this location. If the cage cards do not print out correctly, adjust the margins from the File/Page Setup menu. To solve problems with printing, see the printer notes in the Technical Guide section of this document.

Blank cage cards of any type may be printed from the Main Button Bar or from data entry forms such as the mating forms. JCMS defines four types of cage cards:

1) Mating cage card
2) One-pen wean cage card
3) Two-pen wean cage card
4) Detail cage card

Note that some wean cage cards are designed to print for one pen and some for two pens. The two-pen option is useful for side-by-side shoebox type pens.
A JCMS setup variable, JCMS_PRINT_EXITED_MICE_ON_CAGE_CARDS, will allow you to configure whether or not mice that are not in the colony will print on cage cards. The default value is true, but if changed to false, mice with a status indicating that they have exited the colony (i.e. "Dead," "Missing," "Shipped") will be excluded from the cage card.

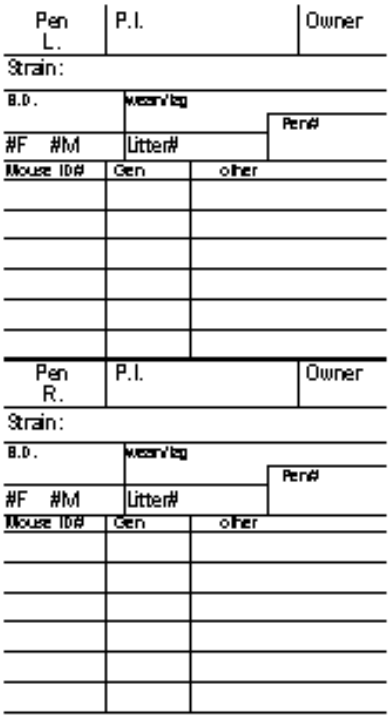
3.5.2 Creating Custom Cage Cards

JCMS is configured to allow new cage card designs to be easily created using the MS Access report design tools.

When JCMS prints a cage card, it writes information from the database into text fields on the card. If a text box is put on a card and given a name that JCMS knows about, then JCMS will write the associated information into that text box when the card is printed. For example, the field PIName is a text box on each cage card where JCMS prints the PI name (as specified in the setup variables).

Make a backup copy of JCMS before making changes (Copy the interface JCMS.mdb file and save as). To view the card designs in JCMS, logon as mtsadmin, press F11, and select the reports tab. To create a new card, simply draw the card wanted and add the fields (as specified in the tables below) that should appear on the card. Use the tables below as references showing what fields can be put on the card. JCMS is installed with a number of cards pre-configured for your use. To create a custom card, it may prove easiest to start with a card similar to the one wanted. Save a copy of the report format for this card under a new name. Now edit this new report format. Place the new report name into the setup variable value for the particular type of cage card. Four cage cards have been created specifically for use to help create new cage cards. These contain all possible fields. These reports have a name ending "withXtraFields".

3.5.2.1 **Two-pen Wean Cards** (setup variable MTS_2PEN_WEAN_CAGE_CARD)



Two-pen wean cards can only be printed as blank cage cards. The PI phone and PI name information will be shown on the card using the values specified in the setup variables called MTS_PI_NAME and MTS_PI_PHONE (these values are set via the Administrator tool bar*, JCMS Setup Variables* button).

Two-pen wean cards can be printed from the following JCMS forms:

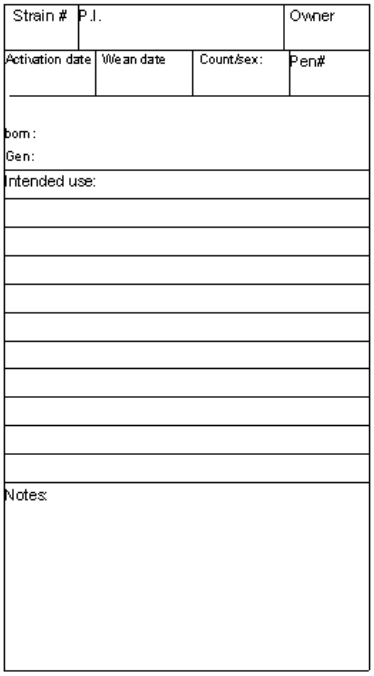
- Print Cage Cards

This card format prints on the upper left corner of the page. Make sure the envelope feeder on the printer is set to print to the far left side.

Figure 3-15
OS_2PWeanCageCard

Field name	***Description***	***Data source***
PINameR	Name of PI responsible for the right cage	Setup variable (MTS_PI_NAME)
PINameL	Name of PI responsible for the left cage	Setup variable (MTS_PI_NAME)
PIPhoneR	A short string of text with PI contact information for right pen	Setup variable (MTS_PI_PHONE)
PIPhoneL	A short string of text with PI contact information for left pen	Setup variable (MTS_PI_PHONE)
PenIDR	Right pen number	generated unique by JCMS or user can generate
PenIDL	Left pen number	generated unique by JCMS or user can generate

3.5.2.2 **One-pen Wean Cards** (setup variable MTS_1PEN_WEAN_CAGE_CARD)



One-pen wean cards can be printed as blank wean cards or with mouse IDs and other pertinent information on them. One-pen wean cards can be printed from the following JCMS forms:

- Print Cage Cards
- Add Litter With Pups
- Import Mice
- Handheld Print Cage Cards
- Pen Info

These two card formats will print centered – make sure the envelope feeder sends the cards through the center of the print path.

Figure 3-16 TS_1PWeanCageCard or TS_1PWeanCageCardWithBarCode

Field name	***Description***	***Data source***
StrainNum	Strain number	Strain table
PIPhone	A short string of text with PI contact information	Setup variable (MTS_PI_PHONE)
Owner	Owner ID	mouse owner
activationDate	Pen activation date	Pen Group table
weanDate	Date mice were weaned or blank if mice imported from external colony	litter table
PenID	A unique pen number	JCMS generated or user specified
countSex	A string with number of mice and sex e.g. “10 M”, would specify ten males	JCMS generated
birthDate	Date of birth of mice	litter table
MatingID	Mating number that produced this litter	mating table
LitterID	Litter number for the litter	litter table
IntendedUse	From CV pull down list	mouseUse
generation	Litter generation	litter table
M1ID	Mouse 1 ID (from litter)	mouse table
M2ID	Mouse 2 ID (from litter)	mouse table
M3ID	Mouse 3 ID (from litter)	mouse table
M4ID	Mouse 4 ID (from litter)	mouse table
M5ID	Mouse 5 ID (from litter)	mouse table
M6ID	Mouse 6 ID (from litter)	mouse table
M7ID	Mouse 7 ID (from litter)	mouse table
M8ID	Mouse 8 ID (from litter)	mouse table
M9ID	Mouse 9 ID (from litter)	mouse table
M10ID	Mouse 10 ID (from litter)	mouse table
penIDBC	Pen ID in barcode format. Must be of the font Code 128AB	User specified
matingIDBC	Mating ID in barcode format. Must be of the font Code 128AB	User specified

3.5.2.3 **One pen wean card for designing new cards**

The report named TS_1PWeanCageCardwithXtraFields may be used for designing a new cage card, it uses the fields and format above. The following fields are added.

Field name	***Description***	***Data source***
protocol1	Protocol for mouse 1	Mouse table
protocol2	Protocol for mouse 2	Mouse table
protocol3	Protocol for mouse 3	Mouse table
protocol4	Protocol for mouse 4	Mouse table
protocol5	Protocol for mouse 5	Mouse table
protocol6	Protocol for mouse 6	Mouse table
protocol7	Protocol for mouse 7	Mouse table
protocol8	Protocol for mouse 8	Mouse table
protocol9	Protocol for mouse 9	Mouse table
protocol10	Protocol for mouse 10	Mouse table
coatColor1	Coat color for mouse 1	Mouse table
coatColor2	Coat color for mouse 2	Mouse table
coatColor3	Coat color for mouse 3	Mouse table
coatColor4	Coat color for mouse 4	Mouse table
coatColor5	Coat color for mouse 5	Mouse table
coatColor6	Coat color for mouse 6	Mouse table
coatColor7	Coat color for mouse 7	Mouse table
coatColor8	Coat color for mouse 8	Mouse table
coatColor9	Coat color for mouse 9	Mouse table
coatColor10	Coat color for mouse 10	Mouse table
comment1	Comment for mouse 1	Mouse table
comment2	Comment for mouse 2	Mouse table
comment3	Comment for mouse 3	Mouse table
comment4	Comment for mouse 4	Mouse table
comment5	Comment for mouse 5	Mouse table
comment6	Comment for mouse 6	Mouse table
comment7	Comment for mouse 7	Mouse table
comment8	Comment for mouse 8	Mouse table
comment9	Comment for mouse 9	Mouse table
comment10	Comment for mouse 10	Mouse table
room	Room number	PenGroup table

3.5.2.4 **Mating Cards** (setup variable MTS_MATING_CAGE_CARD or MTS_MATING_CAGE_CARD2)

Figure 3-17 OS_MatingCAgeCard

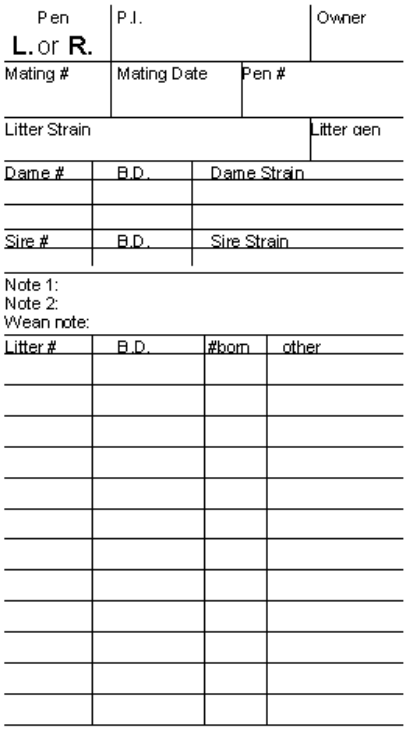


Figure 3-19 TS_MatingCageCard or TS_MatingCageCardStyle1With BarCode

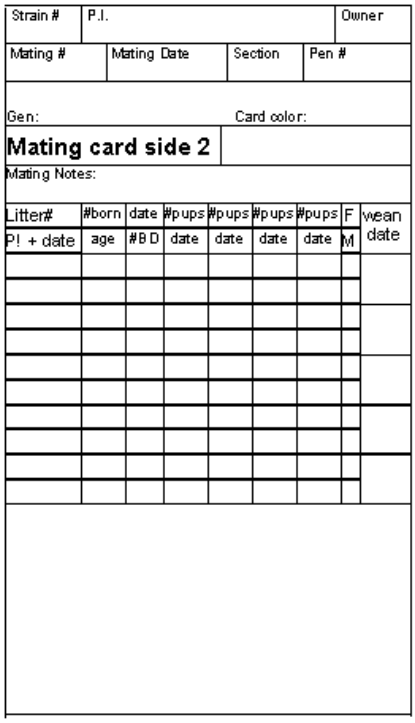


Figure 3-18 TS_MatingCageCardStyle2With BarCode

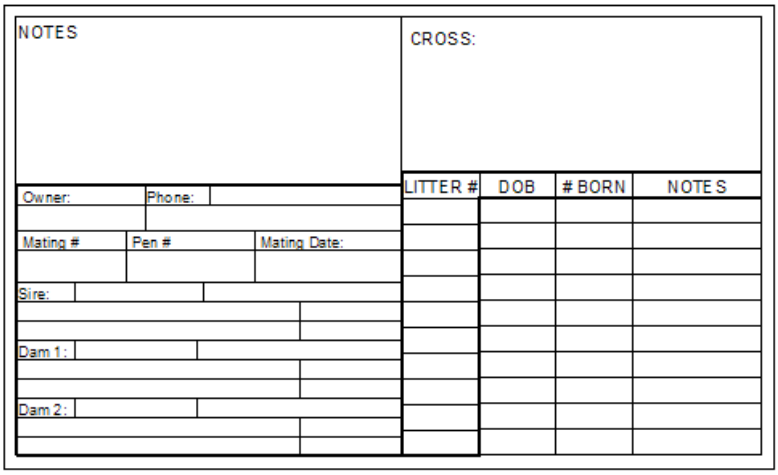


Figure 3-20 MW_MatingCageCardLandscape

Mating cards may be printed from the following set of forms:

- Design Matings
- Activate Matings

- Edit Matings
- Do Matings
- Print Cage Cards
- Handheld Print Cage Cards

The OS Mating Cage Card format prints in the upper left corner of the page. The MW landscape card prints on the left of the page with a one inch left margin. The three TS card formats will print centered at the top of the page. Make sure the envelope feeder sends the cards through the correct print path.

Field name	***Description***	***Data source***	***OS_Mating CageCard Visible?***	***TS_Mating CageCard Visible?***	***MW Visible ?***
PIName	Name of responsible PI	Setup variable (MTS_PI_NAME)	y	y	n
PIPhone	Contact phone for PI	Setup variable MTS_PI_PHONE	y	y	y
owner	Mating owner	mating table	y	y	y
matingID	Mating number	mating table	y	y	y
matingDate	Mating date	mating table	y	y	y
StrainSection	Strain section in mouse room	strain table	n	y	n
PenID	Pen number	(one mouse) mouse table	y	y	y
LitterStrain	Strain of pups	mating table	y	y	y
litterGeneration	Generation of pups	mating table	y	y	y
CardColor	Color of cage card	strain table	n	y	n
dam1ID	Mouse ID for dam 1	mouse table	y	y	y
dam2ID	Mouse ID for dam 2	mouse table	y	y	y
sireID	Mouse ID for sire	mouse table	y	y	y
dam1BirthDate	Birth date of dam1	mouse table	y	y	y
dam2BirthDate	Birth date of dam2	mouse table	y	y	y
sireBirthDate	Birth date of sire	mouse table	y	y	y
dam1Strain	Strain of dam1	mouse table	y	y	y
dam2Strain	Strain of dam2	mouse table	y	y	y
sireStrain	Strain of sire	mouse table	y	y	y
dam1Genotype	Genotype of dam1	genotype table	n	y	y
dam2Genotype	Genotype of dam 2	genotype table	n	y	y
sireGenotype	Genotype of sire	genotype table	n	y	y
dam1JRNum	JR number of dam 1 strain	strain table	n	y	n
dam2JRNum	JR number of dam 2 strain	strain table	n	y	n
sireJRNum	JR number of sire strain	strain table	n	y	n
dam1MatingID	Mating dam1 came from	mating table via litter	n	y	n
dam2MatingID	Mating dam2 came from	mating table via litter	n	y	n
sireMatingID	Mating sire came from	mating table via litter	n	y	n
dam1LitterID	Litter dam1 came from	litter table	n	y	n
dam2LitterID	Litter dam2 came	litter table	n	y	n

Field name	***Description***	***Data source***	***OS_Mating CageCard Visible?***	***TS_Mating CageCard Visible?***	***MW Visible ?***
	from				
sireLitterID	Litter sire came from	litter table	n	y	n
dam1Gen	Generation of dam1	mouse table	n	y	n
dam2Gen	Generation of dam2	mouse table	n	y	n
sireGen	Generation of sire	mouse table	n	y	y
matingNote1	A note about the mating	user selected from pick list on form	y	y	n
matingNote2	Additional mating notes	user selected from pick list on form	n	y	n
weanNote	Additional mating notes	mating table, wean note field	n	y	n
penIDBC	Pen ID in barcode format. Must be of the font Code 128AB	User specified	n	y	n
matingIDBC	Mating ID in barcode format. Must be of the font Code 128AB	User specified	n	n	n
litter1ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter2ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter3ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter4ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter5ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter6ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter7ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter8ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter9ID	Auto generated litter IDs	JCMS generated (optional)	y	y	y
litter10ID	Auto generated litter IDs	JCMS generated (optional)	y	Y	y
protocol	Protocol for dam1	Mouse table	N	N	N
room	Room	PenGroup table	N	N	N
matingComment	Comment	Mating table	N	N	N

Two reports are available to use for designing new cage cards in these formats. They are named TS_MatingCageCardStyle2WithBarCodewithXtraFields and OS_MatingCageCardwithXtraFields. The following fields are visible on both: protocol, room, and matingComment. Note they are

located outside the normal boundaries for an index-sized card. These fields are also on the MW_MatingCageCardLandscape report, but they are not visible. Make a copy of this report before changing it.

3.5.2.5 **Detail Cards** (setup variable MTS_DETAIL_CAGE_CARD)

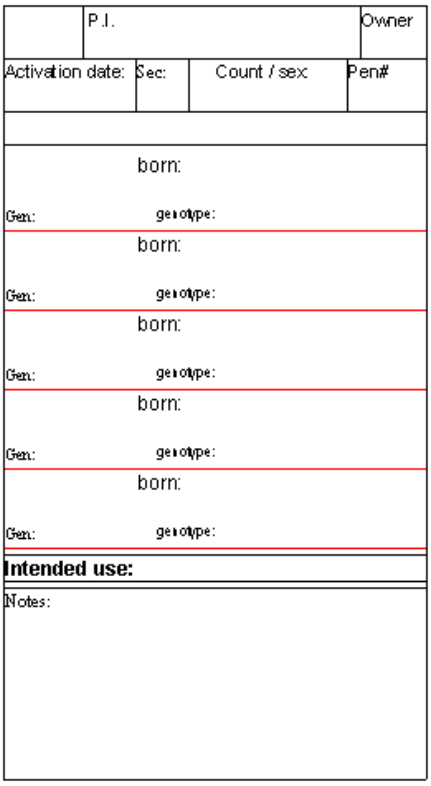


Figure 3-21 TS_DetailCageCard

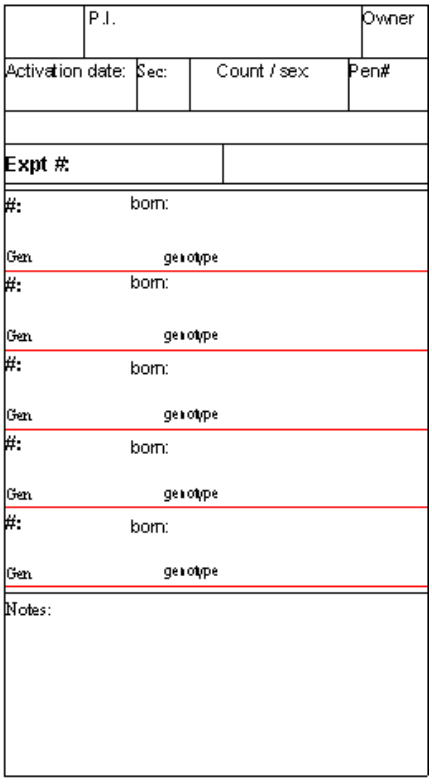


Figure 3-22 TS_DetailCageCardWithBarCode

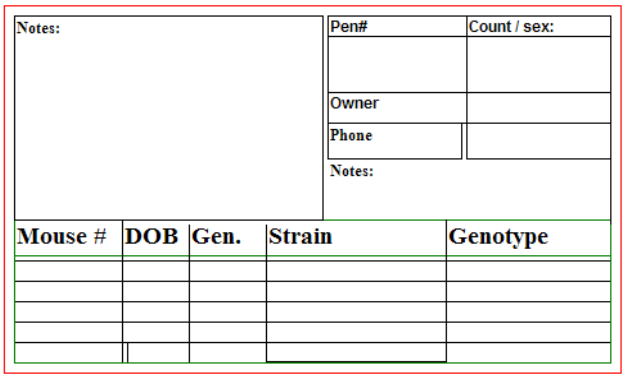


Figure 3-23 MW_DetailCageCardLandscape

Detail cards can be printed from the following forms:

- Pen Info
- Print Cage Cards
- Handheld Print Cage Cards

These two “TS” card formats will print centered – make sure the envelope feeder sends the cards through the center of the print path. The landscape “MW” card prints with a one inch margin, left side.

Field name	***Description***	***Data source***
PIName	Name of responsible PI	Setup variable (MTS_PI_NAME)
PIPhone	Phone number of responsible PI	Setup variable (MTS_PI_PHONE)
Owner	Owner of mice in pen	Mouse table (one mouse)
ActivationDate	Date pen was activated	penGroup table
Section	Strain section	strain table
countSex	String of text with count and sex of mice on it (e.g. 4 M)	Generated by JCMS when mouse information is retrieved.
PenID	Pen number	penGroup, from one mouse
penIDBC	Pen ID in barcode format. Must be of the font Code 128AB	User specified
matingIDBC	Mating ID in barcode format. Must be of the font Code 128AB	User specified
Note	A cage card note	Setup variable (MTS_CAGE_CARD_DETAIL_NOTE)
M1ID	Mouse 1 ID number	mouse table
M1Sex	Mouse 1 Sex	mouse table
M1Born	Mouse 1 DOB	mouse table
M1MID	Mouse 1 is a product of Mating ID	mating table
M11LID	Mouse 1’s litter ID	litter table
M1Strain	Mouse 1’s strain	mouse table
M1Generation	Mouse 1’s generation	mouse table
M1GenoType	Mouse 1’s genotype	genotype table
M2ID	Mouse 2 ID number	mouse table
M2Sex	Mouse 2 Sex	mouse table
M2Born	Mouse 2 DOB	mouse table
M2MID	Mouse 2 is a product of Mating ID	mating table
M2LID	Mouse 2’s litter ID	litter table
M2Strain	Mouse 2’s strain	mouse table
M2Generation	Mouse 2’s generation	mouse table
M2GenoType	Mouse 2’s genotype	genotype table
M3ID	Mouse 3 ID number	mouse table
M3Sex	Mouse 3 Sex	mouse table
M3Born	Mouse 3 DOB	mouse table
M3MID	Mouse 3 is a product of Mating ID	mating table
M3LID	Mouse 3’s litter ID	litter table
M3Strain	Mouse 3’s strain	mouse table
M3Generation	Mouse 3’s generation	mouse table
M3GenoType	Mouse 3’s genotype	genotype table
M4ID	Mouse 4 ID number	mouse table
M4Sex	Mouse 4 Sex	mouse table
M4Born	Mouse 4 DOB	mouse table
M4MID	Mouse 4 is a product of Mating ID	mating table
M4LID	Mouse 4’s litter ID	litter table
M4Strain	Mouse 4’s strain	mouse table
M4Generation	Mouse 4’s generation	mouse table

Field name	*Description*	*Data source*
M4GenoType	Mouse 4's genotype	genotype table
M5ID	Mouse 5 ID number	mouse table
M5Sex	Mouse 5 Sex	mouse table
M5Born	Mouse 5 DOB	mouse table
M5MID	Mouse 5 is a product of Mating ID	mating table
M5LID	Mouse 5's litter ID	litter table
M5Strain	Mouse 5's strain	mouse table
M5Generation	Mouse 5's generation	mouse table
M4GenoType	Mouse 5's genotype	genotype table

3.5.2.6 **Detail card for designing new cards**

The report named TS_DetailCageCardwithXtraFields may be used for designing a new cage card. It uses the fields and formats shown above. The following fields are added. These fields are also on the MW_DetailCageCardLandscape report, but they are not visible. Make a copy of this report before changing it.

Field name	*Description*	*Data source*
protocol1	Protocol for mouse 1	Mouse table
protocol2	Protocol for mouse 2	Mouse table
protocol3	Protocol for mouse 3	Mouse table
protocol4	Protocol for mouse 4	Mouse table
protocol5	Protocol for mouse 5	Mouse table
coatColor1	Coat color for mouse 1	Mouse table
coatColor2	Coat color for mouse 2	Mouse table
coatColor3	Coat color for mouse 3	Mouse table
coatColor4	Coat color for mouse 4	Mouse table
coatColor5	Coat color for mouse 5	Mouse table
comment1	Comment for mouse 1	Mouse table
comment2	Comment for mouse 2	Mouse table
comment3	Comment for mouse 3	Mouse table
comment4	Comment for mouse 4	Mouse table
comment5	Comment for mouse 5	Mouse table
room	Room number	PenGroup table
weanDate1	Wean date for mouse 1	Litter table
weanDate2	Wean date for mouse 2	Litter table
weanDate3	Wean date for mouse 3	Litter table
weanDate4	Wean date for mouse 4	Litter table
weanDate5	Wean date for mouse 5	Litter table

3.6 Setting up an Experimental Plan

If the experimental data tables will be used, the following CV tables must also have values**: field of study** and **keywords**. Controlled vocabularies are changed from the **Administrator** button bar and may only be changed by the mtsadmin user.

See the section on Experimental Plans for more information on the details of setting up this portion of the database. Owners are able to set up all other aspects of Experimental Plans.

4 User Setup

A new user must first be setup with an MS Access account and password logon by the Administrator. The Administrator will also do any client installation necessary on a computer used by the new user.

4.1 Logging In and Passwords

To provide database security MS Access requires all users of JCMS to have a unique logon account and password. This logon is separate from any other that may be used by a user's system such as the Windows logon.

To start JCMS, double click the JCMS icon on the desktop. A dialog box will request the user name and password. The user login name will be displayed on each form that is displayed on the screen.

Figure 4-1 User Logon Screen

The JCMS Welcome window displays at startup. Click the *start JCMS* or *Handheld Forms* button to begin work. The *Main Button Bar* is displayed next. From this button bar forms can be opened for entering and viewing JCMS data.

Check with the Administrator if entering the logon and password he/she provided does not result in the JCMS welcome screen appearing.

5 Basics on Using JCMS

5.1 What are Owners and Secretaries?

Access to the functions of the database is restricted on a form-by-form basis. That is, each form is programmed to allow access to JCMS for certain users (based on their security level). JCMS defines a security hierarchy with three levels of permission: Administrator, Owner, and Secretary. The Administrator can access all forms and all data; owners can enter mice, matings, experimental plans, and experimental data and access all data entry and query forms from the Main Button Bar; secretaries can usually access only a limited subset of data entry forms.

Within the database, *mice*, *matings, experimental plans,* and *experimental data* have *owners*. The owner of a mating also owns any *litters* produced by that mating. The owner of an experimental plan also owns any experimental data that is part of the plan. Owners may use all forms that have access permission to the database at an *owners* or *secretary* level. Forms for editing a

mouse, mating, litter, experimental plan, or experimental data usually restrict edit permission to owners only.

Secretaries may use only those forms with secretary level access. Additionally, secretaries are associated with owners (by being members of an owner's secretary group); thus, secretaries can only work with data associated with a specific owner.

It is possible for a user to be both an owner of their own mice and to act as the "secretary" for one or more other owners.

The Administrator will have decided the owner or secretary status of each user and set this up as part of the user's logon. The Administrator may also change the default security access level for most forms.

5.2 Changing Passwords

When a user logs in for the first time, he/she may not have a password or may have a special password assigned by the Administrator. To create or change this password, select from the main menu, **tools – security – user and group accounts.** Click on the **Change Logon Password tab** and add or change the password. Only you can change your password.

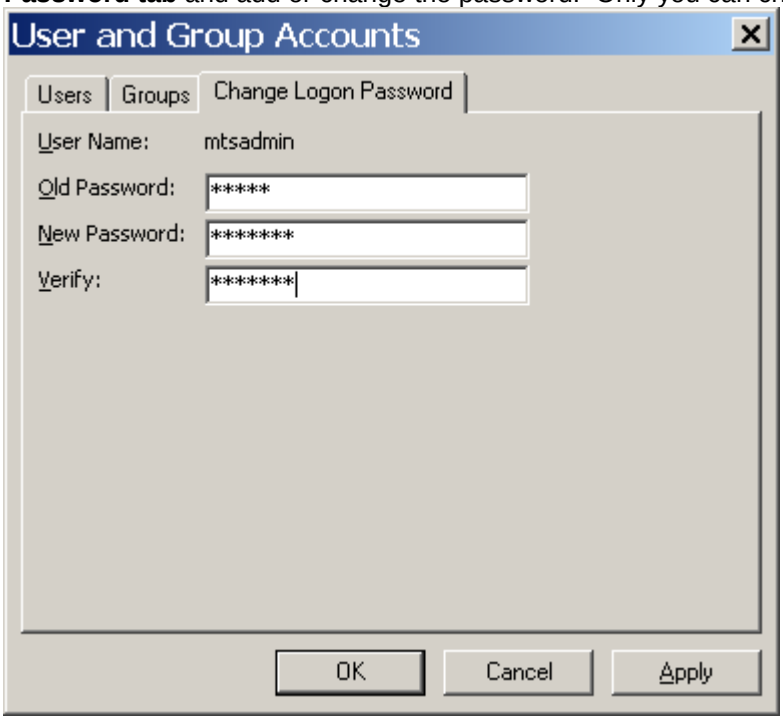


Figure 5-1 Dialog Box: Change Password

5.3 Button Bars

JCMS uses button bars to provide easy access to its many functions.

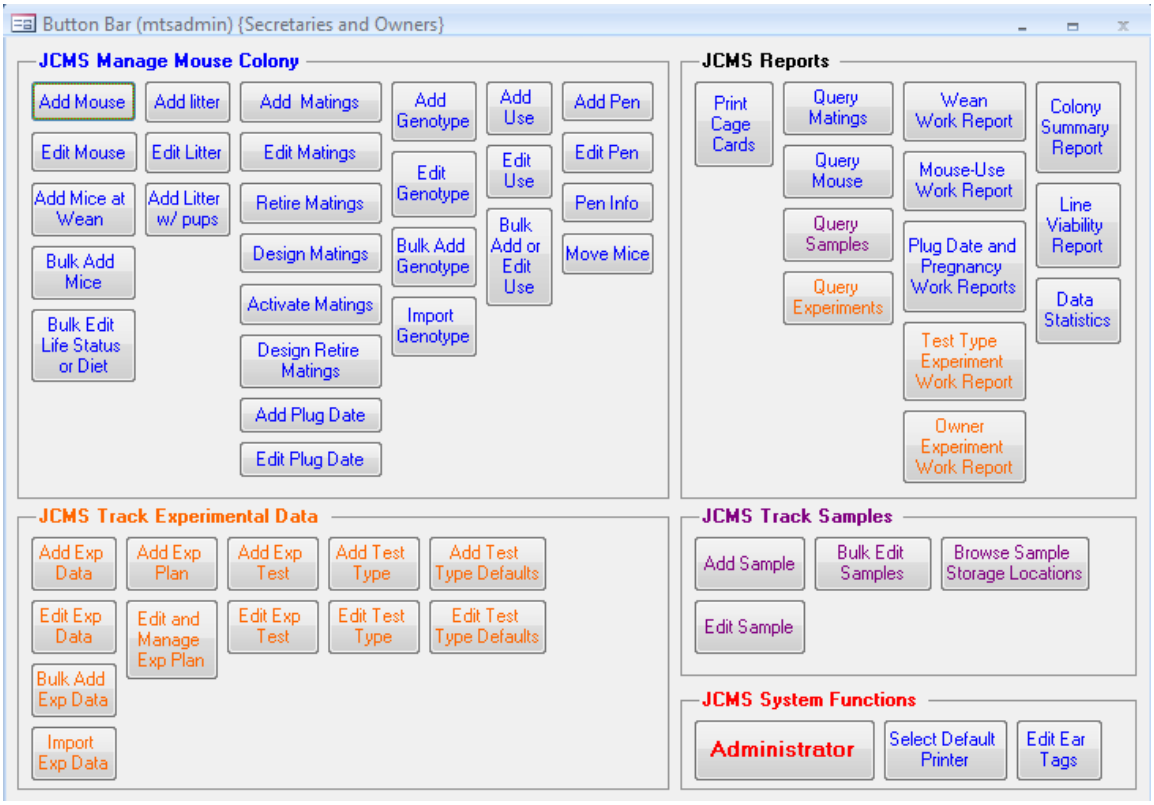


Figure 5-2 Form: Main Button Bar

Clicking buttons on the button bar(s) opens JCMS forms. After pressing the start JCMS button, the main button bar opens and is always open from then on (until JCMS is shut down). The main button bar cannot be closed, but can be minimized.

The main button bar is organized into columns for different functions. Note that some buttons will appear to not work for "secretaries" because they do not have permission to open that form. The Administrator button will work only for the Administrator. The buttons with orange text are used only if the Experimental Data portion of JCMS is in use.

5.4 Using the Forms

Forms may be **closed** or **minimized** using the normal Windows minimize (**–**) button and close (**x**) button. Multiple forms may be open on the screen at one time.

There are three general form types: edit, add-new, and query. Some forms allow combined functionality (e.g. allow you to add new or edit). Data entry text boxes are white. Text boxes that are blue-green in color are active boxes. Entering a valid number in an active box followed by moving the cursor out of the box (by tabbing or clicking the mouse pointer in another box) will cause the database to display information associated with that item.

Data entry boxes with a drop down list (click on the down arrow ▼) allow choosing an item from a list. The item can also be typed directly into the box; as you type, the first item in the list that matches the characters typed so far is displayed. In either case, press tab to accept an item and move to the next field. Most drop down lists are limited to items in the list.

Gray boxes display information that cannot be changed using this form. All forms can be navigated through quickly by tabbing to move forward and shift tabbing to move backward through the fields.

Any form that has a **Submit button** will not update the database until this button is clicked. If a form is closed before hitting the submit button, changes made on the form will not be saved in JCMS.

The **clear button** is used to remove all data from the form. The clear button does not delete data from the database.

Extra button(s) on the form will often open another form showing data associated with an ID on the first form (mouse, litter, mating, pen, experimental data, etc.) For example, the **set genotype button** on the edit mouse form opens the add genotype form showing data for the mouse ID used on the edit mouse form, all ready to work with.

5.4.1 Special Features of Some Forms

Why are adding and editing functions kept separately on different forms? In general, add and edit forms will look very similar to each other. Different forms are used because creating a new record is a separate function from changing an existing one. If an error has been made on an add form, then open the edit version of this form to correct it. Edit forms do limit editing capabilities based on the *owner* or *secretary* permission status.

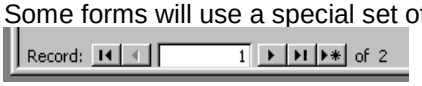
Color fields on submit: by default, some of the forms to use auto-color. After a new record is submitted to the database, all the text fields (except checkboxes) have their background colored green. When these fields are visited by tabbing or using the mouse, the colored background disappears. The purpose of this feature is to prompt visiting each field when doing a lot of data entry so that values from the previous record are not erroneously entered into the new record. This feature may be turned off by the Administrator in the setup variables by changing MTS_AUTO_COLOR to false.

Pen Info Button: this button allows viewing the contents of a pen related to the form. When this button is pressed the pen info form appears with a list of all mice in the pen and other pertinent information about the pen.

Increment ID check box: when this box is checked, the main ID field of the form is automatically incremented. This feature is useful when entering a lot of information that uses successive ID numbers. NOTE: ID numbers may have characters and leading zeros in them. Thus, the ID number cd012 would increment to cd013, and 099 would increment to 100 (as examples). The default for this to be set to on or off on most forms is changed in the setup variables by the Administrator using MTS_DEFAULT_AUTO_INCREMENT, JCMS_ACTIVATE_MATINGS_INCREMENT, etc. Some forms always default to NOT auto increment regardless of the value of this set variable.

5.5 Navigation Buttons

Some forms will use a special set of navigation buttons to move from one record to another.



Clicking ▸ will move forward by one record, ▸| will move to the last record, ▸* will provide a blank space to enter a new record. The number in the box indicates which record is currently displayed (first, second, third, etc.) Records are numbered by the order they are sorted into in the database. If the sort criteria is changed, this number may change for the record on display, it only reflects the record's relative placement in the sort order.

5.6 Session Reports

Session box: session boxes give some history information about this edit session. A session lasts only as long as the form is open on the screen. A typical session box shows the ID and one or two bits of important information about each record entered or edited. The most recent entries are listed first in the list box.

Printable session report: this button allows viewing a more detailed session report than is available in the session box. Print the session report using the File/Print option on the main menu bar.

5.7 Printing

JCMS will use the default printer as set up on the client machine. Most reports will display as a print preview in order to help save printing unnecessary pages.

The default printer may be temporarily changed for one JCMS session. The change will not affect the Windows default printer for any other program.

Many modern printers will use the sheet feeder as the default whenever there is paper in the sheet feeder. To print cage cards, open the sheet feeder and load the cards into the envelope feeder part of it. Also set the printer to use as straight a paper path as possible. Many printers have an option for sending sheets out the back if it is open or have a toggle switch to change the path.

Forms are not designed to print nicely on a page, use a report for a quality printout of information in a form. However, there are circumstances where it may be advantageous to print a copy of a form.

Use the **printer icon on the toolbar** with caution; this will often try to print the entire table, not just the values shown on the form on the screen. To determine if the form fits on one page of paper, try using the **print preview button** on the toolbar. If the screen is truncated on the right, change the page setup to landscape. This will also show if the results give all the records in the table instead of just one. Use the **close** button on the print preview window to get back to the form or the print icon to print what is shown in the preview.

To **print just a selected record** from forms that print the whole table, use the File menu. **Select Print from the File menu** and the print dialog box will open. Under the print range, pick **Selected record(s).** Now, only the record on the form or with the cursor in a field on it will print.

Most forms will not **print with all blank fields**. When the cursor is placed into a new blank record, print the selected record gives only the header for the form. To print a blank copy, first create a dummy record, placing something such as a decimal point into the required fields. Then print this selected record and delete it. Also note that only the Administrator has permission to delete records from some of the tables.

5.8 Statistics

Click the Data Stats button on the main button bar to get information on the total number of pens in use, numbers of mice and matings in the database.

6 Mice

6.1 Adding Mice

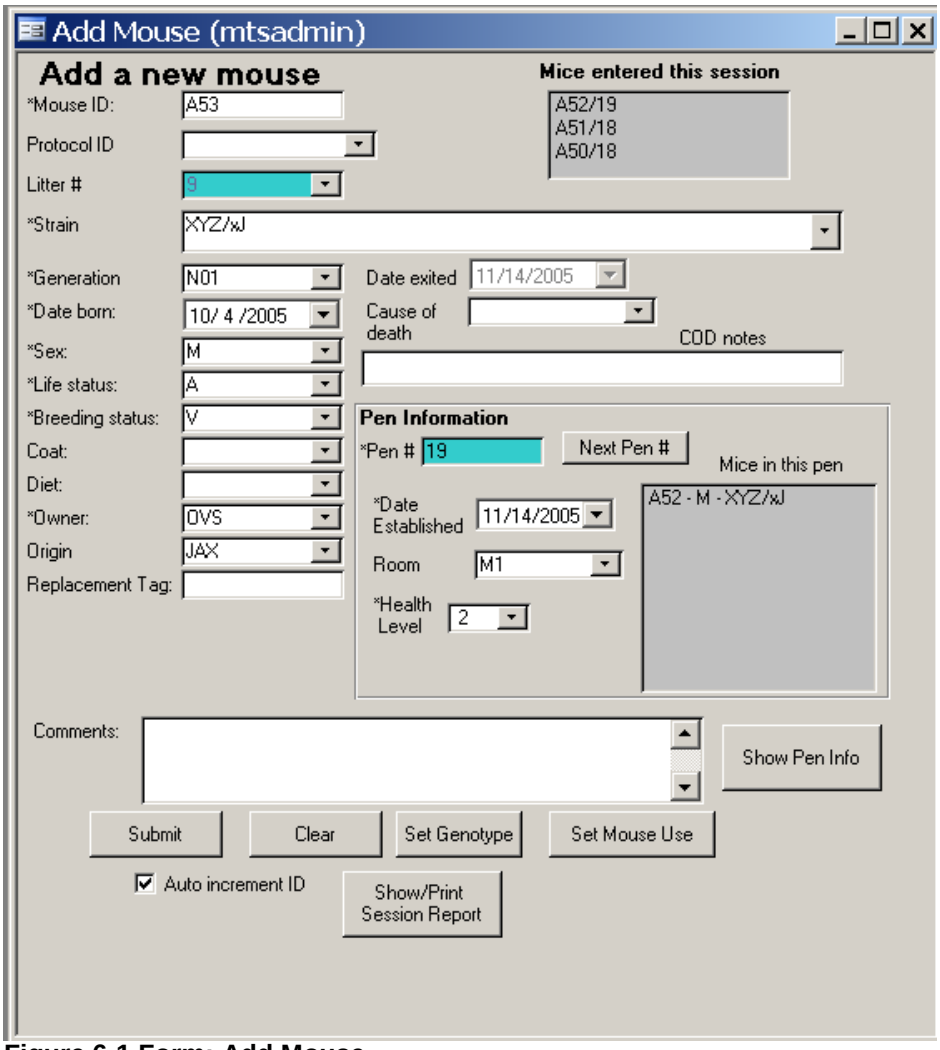


Figure 6-1 Form: Add Mouse

Use the **Add Mouse** button on the main button bar to open the form. The Add a new mouse at weaning form will automatically fill in the information from the litter for each mouse, saving typing time. If adding mice to the database right when they are weaned, consider using the **Wean** button instead.

Each mouse must have a unique ID number. JCMS will not allow entry of duplicate ID numbers. If this version of JCMS has been set up to use a prefix on the mouse ID, this is only entered if JCMS is creating the ID numbers. On this form, the prefix must be entered on the ID number by the user.

When mice are added, they must be assigned to a pen group. The pen information section of these forms is used for this purpose. If the pen ID# entered on the form already exists, the room #, list of mice, and other information will be retrieved and displayed in the pen information section. Changes to the pen information may also be made using this form.

If an error message is given, the error must be corrected and the submit button pressed again. A successful submit will result in a message stating, "Mouse *xxx* submitted" in red on the form. The session box will also list the mouse ID and pen #.

6.2 Editing Mice

Changes are made to individual mice using the **Edit Mouse button** to open the edit a mouse form. This form works in the same manner as the Add mouse form. If a selected mouse has genotype information associated with it, it will be displayed on the form.

6.2.1 Changing the ID of a mouse

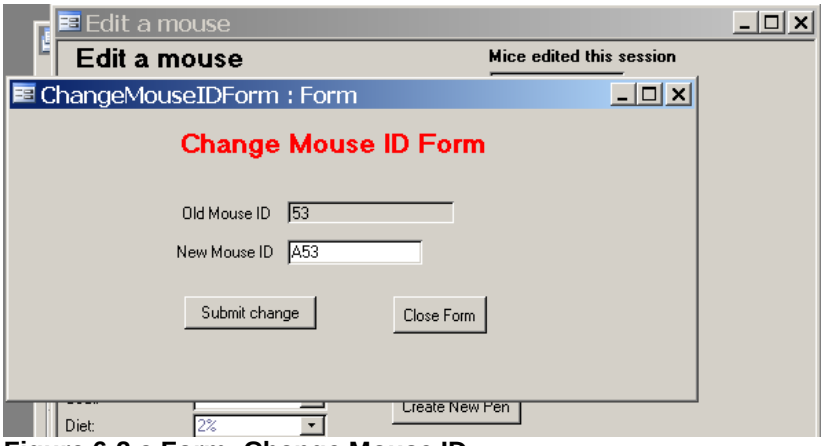


Figure 6-2.a Form: Change Mouse ID

The ID of any mouse in JCMS may be changed as long as the new name is unique in the database. For example, if mice are ear notched so they are unique in a pen, punches may need to be added to the mouse ear when the mouse is moved to a new pen. A code could be appended at the end of the mouse ID number to indicate its current ear-punch value (e.g., 2373-R, 2373-L, 2373-RR, 2373-LL, 2373-RL, 2373-RRL, 2373-RLL, 2373-RRLL). When the mouse moves, and the notch changes, update the mouse ID accordingly. To change a mouse ID, use the mouse edit form. Click the *change ID* button on the form. Fill out the dialog box with the new ID and press submit change to change the mouse ID in JCMS. (The ID may not be changed to an already existing ID).

The Edit Mouse form also allows you to navigate through the mice in the database - a mouse browser.

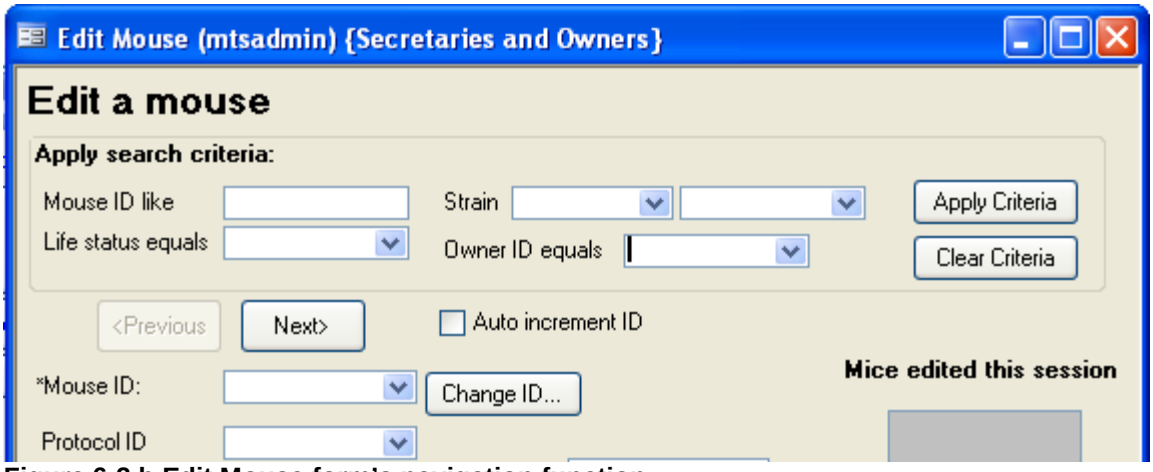


Figure 6-2.b Edit Mouse form's navigation function

The user can set certain filter criteria and apply them to the mice in the database. When applied only those mice meeting the criteria will become available in the lower section for viewing or editing. The criteria are ANDed together, that is, for a mouse to be included it must meet all of the selected criteria. Some fields support substrings while others (life status and owner) accept only exact matches.

6.3 Importing Mice

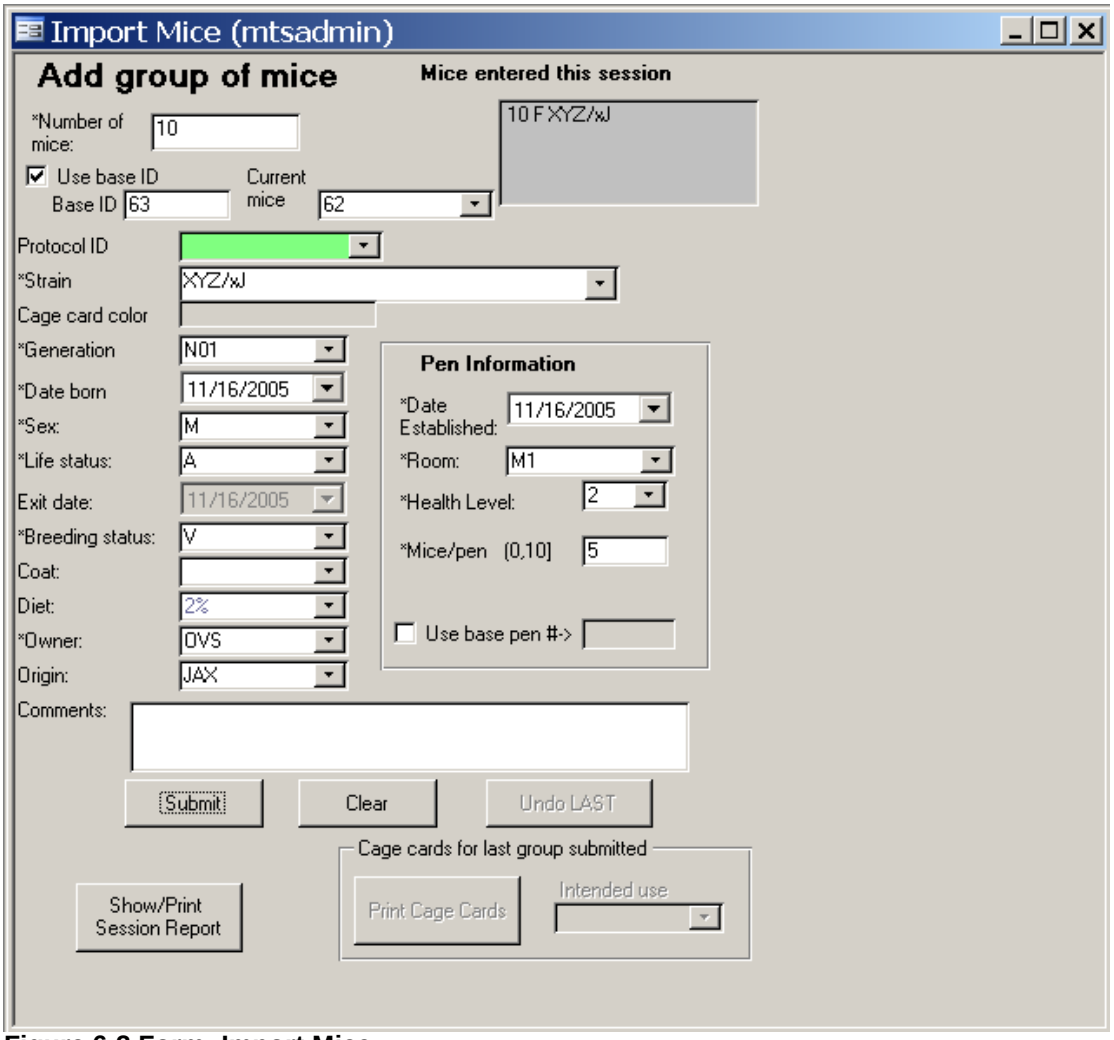


Figure 6-3 Form: Import Mice

This form is useful when bringing a group of mice in from outside the colony or when adding a new group of mice that are all similar. The group must all have the same information for the required fields, the fields marked on the form with an *. JCMS will automatically generate unique mouse ID numbers and will increment by one for each additional mouse imported. Set the Base ID to the first ID number to be used. This form will not add any mouse ID Prefix specified in the setup variables; enter the prefix as part of the base ID.

The new pens will be automatically assigned and filled with the number of mice specified or if the MTS_RELAXED_PEN_NUMS setup variable is set to *true*, the user can set their own base pen number. If you specify your own base pen number, JCMS will try to create pens starting with the pen number specified. Pen numbers must be unique, so the provided base pen number must not be already used in the database (and all pen numbers generated from the base number must be unique) or an error message will be given and the transaction will be rolled back (i.e. no mice imported).

Once mice are added, cage cards can be printed. Any intended use entered on this form will only be printed on the cage cards; it will not be saved with the mouse.

Do not use this form if the parents of the mice are already in the database as it does not add the litter number. The litter number is used to look up the parents.

6.4 Adding Mice at Weaning

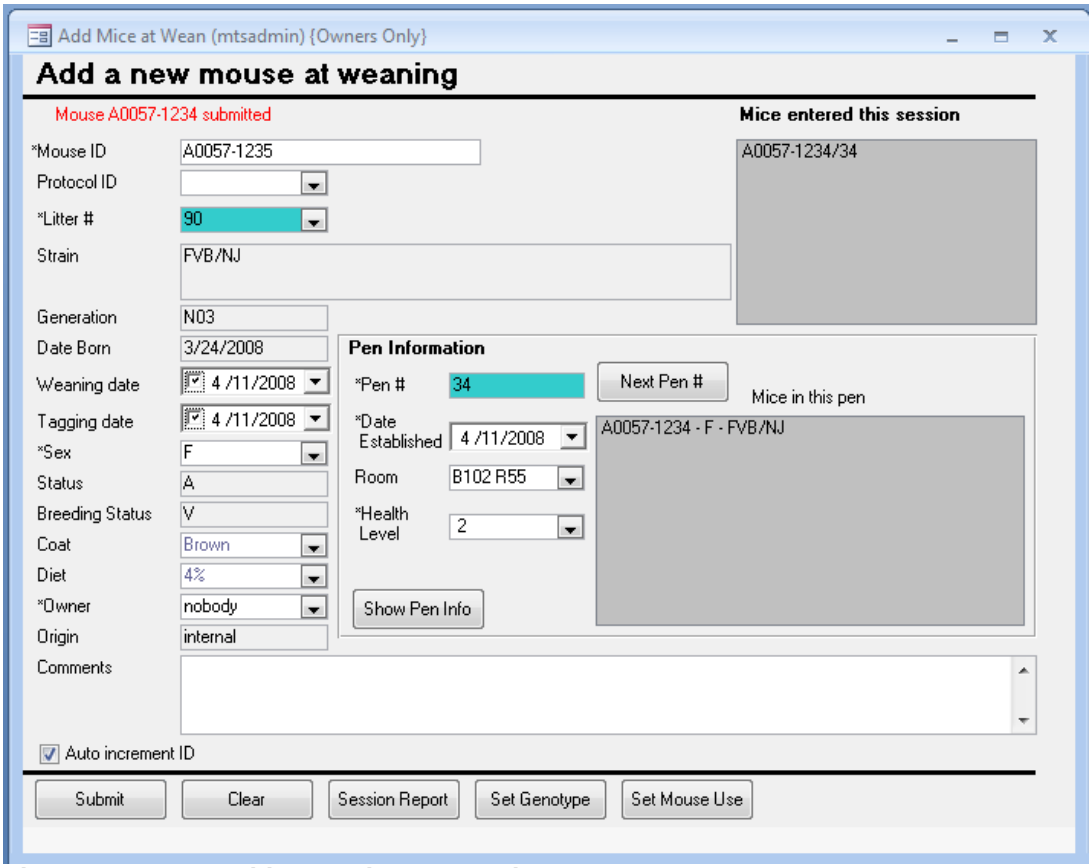


Figure 6-4 Form: Add New Mice at Weaning

Use this form to add mice into the database when they are weaned. This form adds mice one at a time and must be used if the litter record has already been created. If not, consider using the Add Litter w/Pups form instead. That form will add the litter record plus all the pups as weaned mice in one step. Which form will work best depends upon the workflow.

Once the litter # is entered, the form will display the strain, generation, date born, wean date, and tag date from the litter record. It automatically sets the life status to alive and breeding status to virgin.

Any change made to the wean date or tag date on this form will also update the litter record when the mouse is submitted. Note that unlike the Edit Litter form, this form makes no attempt to keep the wean and tag dates synchronized.

To print a cage card for a pen, click the **Show Pen Info** button.

6.5 Changing Life Status or Diet of a Group of Mice

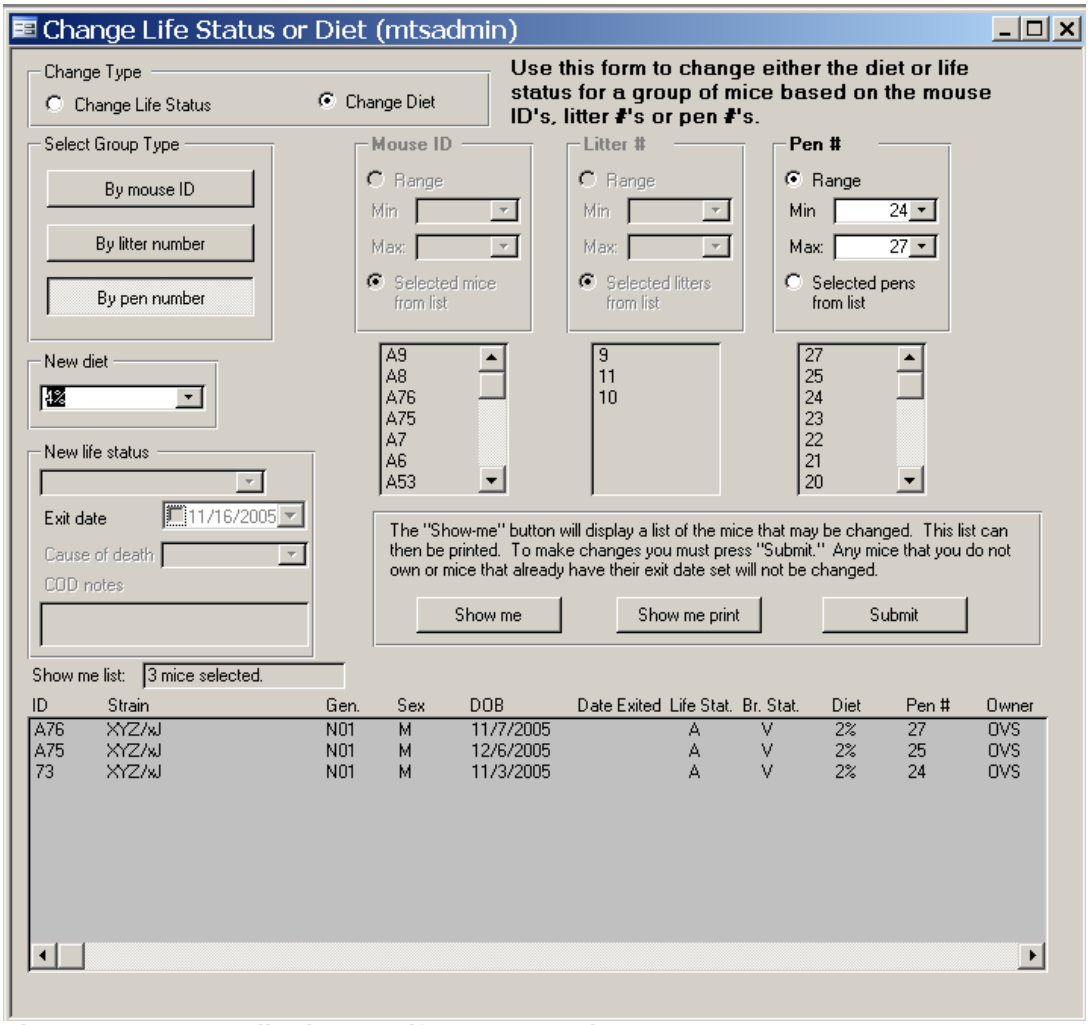


Figure 6-5 Form: Bulk Change Life Status or Diet

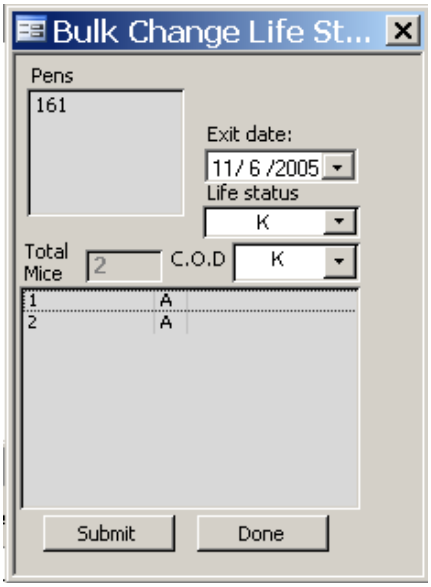


Figure 6-6 Handheld Form: Change Life Status

JCMS allows users to do a few edit operations en-mass. Select the Bulk Change Life Status or Diet button. First select either to change the life status or to change the diet. Mice may be selected for the edit operation by litter, pen, or mouse ID. Use the show-me button to display a list of mice that may be affected by the operation when submit is pressed. No changes are made to the mice until submit is pressed. Any mice that you do not own or that already have their exit date set will not be changed. Use the show me print button to get a list of the mice changes.

6.6 Changing Life Status using Handheld

This handheld form allows changing the life status of all mice in the selected pens at once. All the mice must be changed to the same new life status and if it is an exit status, to the same exit date and cause of death.

6.7 Change Life Status of an Individual Mouse using Handheld

Use this handheld form to change the life status of selected mice in one pen. The new life status, exit date and cause of death must be the same for all mice selected.

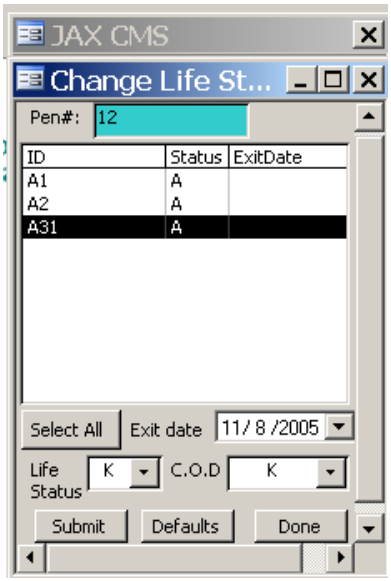


Figure 6-7 Handheld Form: Individual Mouse Change Life Status

7 Pens and Cage Cards

All mice reside in a pen. In JCMS one pen of mice is referred to as a pen group that has a unique pen ID number. A pen group may be empty because it is retired (all mice are removed and this number is no longer in use). The database limits the number of mice in a pen group to the number specified in the setup variables (MTS_MAX_MICE_PER_PEN).

Pen numbers are unique integers that are either generated by JCMS (and therefore assured to be unique) or provided by JCMS users. If the user prefers to generate pen numbers, the setup variable called MTS_RELAXED_PEN_NUMS must be set to true. JCMS will never allow duplicate pen numbers to be entered into the database. JCMS will also warn if a user tries to enter a pen number much larger than any previous pen number used (it keeps track of the largest pen number used). The largest pen number that can be entered into JCMS is 2,000,000,000. However, very large pen numbers may not print out correctly on all cage cards due to lack of space. If this is a problem, cage cards can be configured to have more space for display of the pen numbers. A short string of characters can be prefixed on Pen IDs generated by JCMS when they are printed. The Administrator must specify this string in the setup variable MTS_PEN_ID_PREFIX.

7.1 Adding Pens

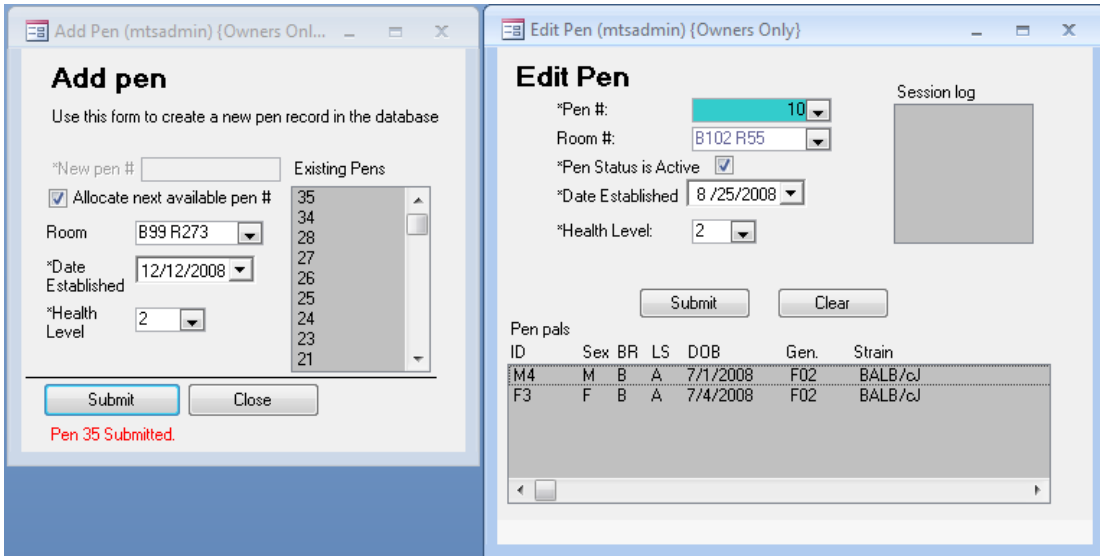


Figure 7-1 Forms: Add and Edit Pens

New pens are added when new mice are created in the database using the **Add Mouse, Import Mice, Wean,** or **Add Litter w/ pups** buttons. A new pen can be created when changes are made to a mouse using the **Edit Mouse** button. The **Design Matings** form will assign pen numbers to matings, but the pen is not created until it is activated using the **Activate Matings** form. The **Add Matings** form will automatically generate new pens.

Information about the pen (room #, health level) can be edited while adding it on some of the forms.

If a pen does not exist in the database, it may be added as long as the pen ID number used is less than or equal to the largest pen number printed on a cage card OR if the MTS_RELAXED_PEN_NUMS mode is set to true. Use the **new pen** button on the main button bar. Then manually add a new pen. Note this is rarely done as pens can be created when the mice are placed into them by using the other forms.

7.2 Editing and Retiring Pens

Use the **Edit Pen** button to open the form. Enter the pen ID in the blue-green box and the information for that pen will appear. Unchecking the "pen status is active" box will mark this pen as retired. Retired pens may be maintained in the database for historical purposes.

7.3 Moving Mice between Pens

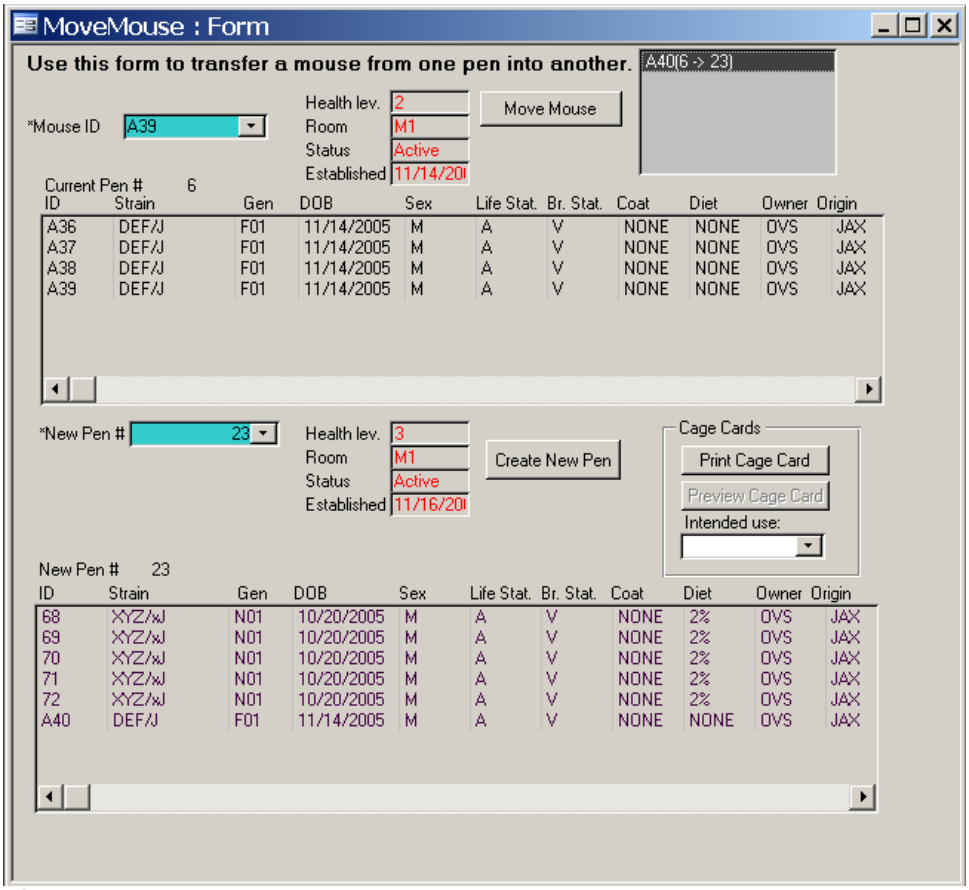


Figure 7-2 Form: Move Mouse

When mice are moved around (using the **Move Mice** button) they may need to be moved into pens that do not exist yet in the database. In this case, use the **Create new pen button** on the move mice form to add the pen. The session box will indicate the mouse ID moved and it's old and new pen ID number. This form moves only one mouse at a time, not all mice in the pen. The new pen box on the bottom of the form shows any mice currently in the selected pen.

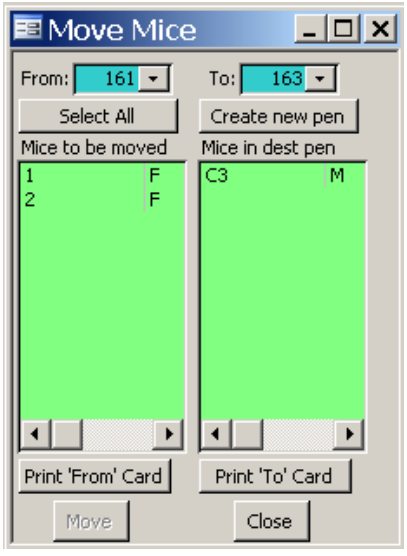


Figure 7-3 Handheld Form: Move Mice

7.4 Moving Mice using Handheld

First select the two pen ID numbers and choose Move Mice from the handheld main menu. Then select one or more mice to move. A new pen may also be created at this point to move the mice into.

7.5 Printing Cage Cards using Handheld

The Move mice form allows optional printing of new cage cards for both the old (from) pen and for the destination pen showing the current mice. Print the card(s) after doing the move. The Trio and Pair Mating forms allow cage cards to be

automatically printed. Cage cards can also be printed by selecting individual pen numbers.

7.6 Printing Cage Cards

Most forms that allow the creation of a pen also allow cage cards to be printed after the pen is created. Note that when blank cage cards are printed using the **Print Cage Cards** button, pen records are not actually put into the JCMS database. These blank pre-numbered cards are created to prevent the accidental use of duplicate pen IDs in the mouse room. Blank cards that are not used (because they are lost, damaged, etc.) have numbers that will never be used in the database.

7.7 Retiring and Deleting Pens Automatically

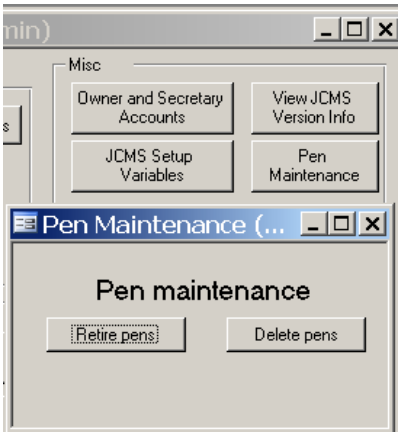


Figure 7-4 Form: Pen Maintenance

Retiring and deleting pens is an Administrator function, found on the Administrator button bar. Use the **Pen Maintenance** button to open this form. First click the **Retire pens** button. This will search the database for pens that are empty (have no mice in them or have only mice in them that are not alive). These pens will be marked as retired (the pen status is active check box will be unchecked). Then click the **Delete pens** button. This will only delete pens that have no mice in them at all, live or dead (some pens get orphaned because mice are moved to other pens). Retired pens that have only dead mice (or any life status other than alive) are left for reference purposes.

NOTE: the pen maintenance functions can take a long time to complete. Trial runs show that on a Pentium III 600MHz computer running JCMS with 2000 pens, the pen maintenance functions take about 3 minutes each to run. The compute time will probably grow as n(logn) (but could be as bad as n^2, depending on how MS Access optimizes its queries), where n is the number of cages in the database. If you have more than 10,000 pens, you should consider running the pen maintenance functions when you have several hours available in which the database will not be used. You should also back up your database before running these functions just in case they take too long to complete. Whether or not this precaution is necessary will not be known until we have more experience with JCMS performance with very large data sets.

8 Matings

JCMS is flexible in that you can choose to either set up matings on the computer (design a mating) or do the mating work in the mouse room and later enter the information into JCMS. If the design first method is used, then the mating must be *activated* on the computer after the mating is set up in the mouse room.

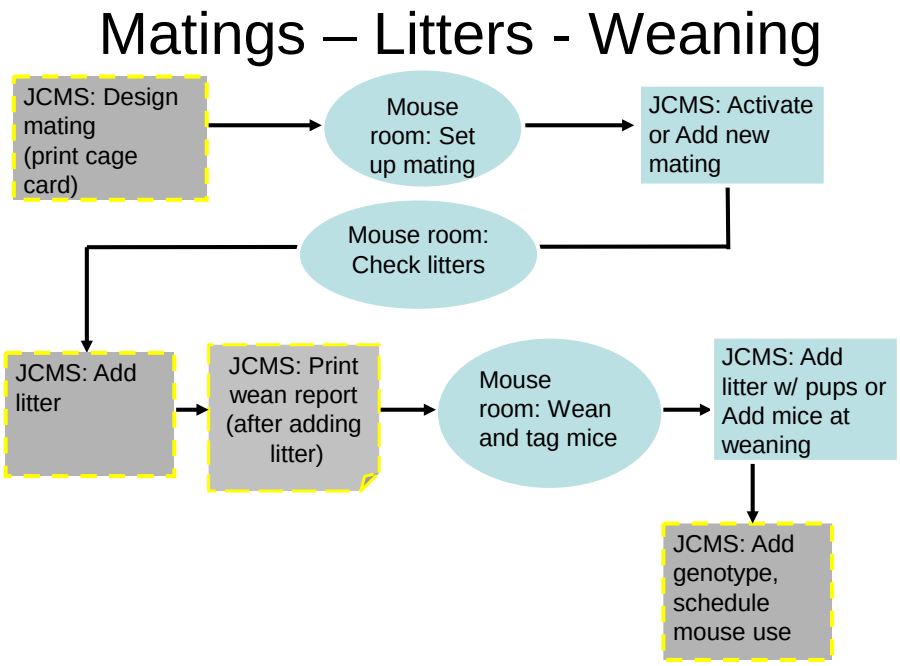


Figure 8-1 Mating to Weaning Diagram

This diagram shows a *typical* flow of information from JCMS to the mouse room and back to JCMS. Dashed boxes are optional. JCMS also has a special add litter form for use for those who prefer to wean mice before entering the litter information into JCMS.

8.1.1 Automatic Litter Number Generation

JCMS can generate litter numbers automatically. To use auto litter numbering, set the setup variable MTS_AUTO_LITTER_NUMS to “on.” When this variable is set to on, JCMS generates litter numbers and associates the litter numbers with a mating.

Litter numbers are generated by JCMS in batches. The size of the litter number batches is a function of the setup variable called MTS_NUM_AUTO_LITTER_NUMS (the number of automatic litter numbers). It is recommended that the value of this variable be set to 10 or 100. By using a round number (like 10 or 100) it is easy to identify a litter as being the first, second, third etc., by simply looking at the litter number.

8.2 Which Mating Forms to Use?

Design Mating is used by those who want to set up their matings on paper by using the computer ahead of time. Activate Matings must then be used after the mating has been performed in the mouse room. Others prefer to first do the matings in the mouse room, then return to the computer and use the Add Mating form to enter the information. The Add Mating form may also be used in the mouse room on a laptop computer. If handheld computers are used in the mouse room, there is a special Do Pair or Do Trio mating form to use.

The Edit Mating form is provided for correcting any errors that were made in previous data entry.

Eventually, the mating will be ended or “retired”. Some plan the ending of matings ahead of time using the Design Retire Matings form. All matings use the Retire Matings form when ended. When the Design Retire matings is used first, information given in the design stage is used for the defaults on the Retire mating form. This information may still be changed to reflect last minute changes made in the mouse room.

Sires are often used in more than one mating simultaneously. JCMS will warn that a mouse is already in use in another unretired mating.

Cage card note choices are set up by the Administrator by using the Administrator button bar.

8.3 Approved Litter Strains

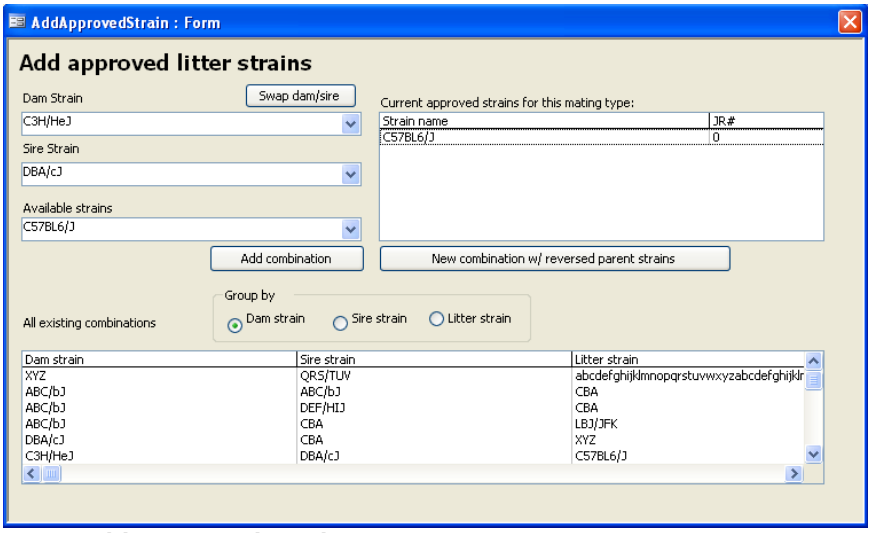


Figure 8-2 Form: Add Approved Strains

The Administrator has the optional ability to create a table of approved litter strains. An approved litter strain field is a function of the dam strain and the sire strain. A sire strain and dam strain combination is **not** unique. That is, a sire and dam strain combination may result in multiple litter strains. The special case of when the sire and dam strains are the same will result in that strain always being ‘approved’ and need not be entered in the database. Approved strain records can be active or inactive. Inactive records are ignored as candidates for litter strains. They are kept in the database for documentation purposes and possible future use.

The “Use approved matings only” check box on the mating forms will be initialized to the value of JCMS_ENFORCE_APPROVED_MATINGS in the setup variables. When this is set to true, the user will be warned a litter strain is not on the list. The user may override the warning and still enter the unapproved strain.

The forms for adding and editing approved litter strains are invoked from the main button bar by clicking the **Administrator** button. Use the two buttons: **Add Approved Strains** and **Edit Approved Strains**.

8.4 Designing a New Mating

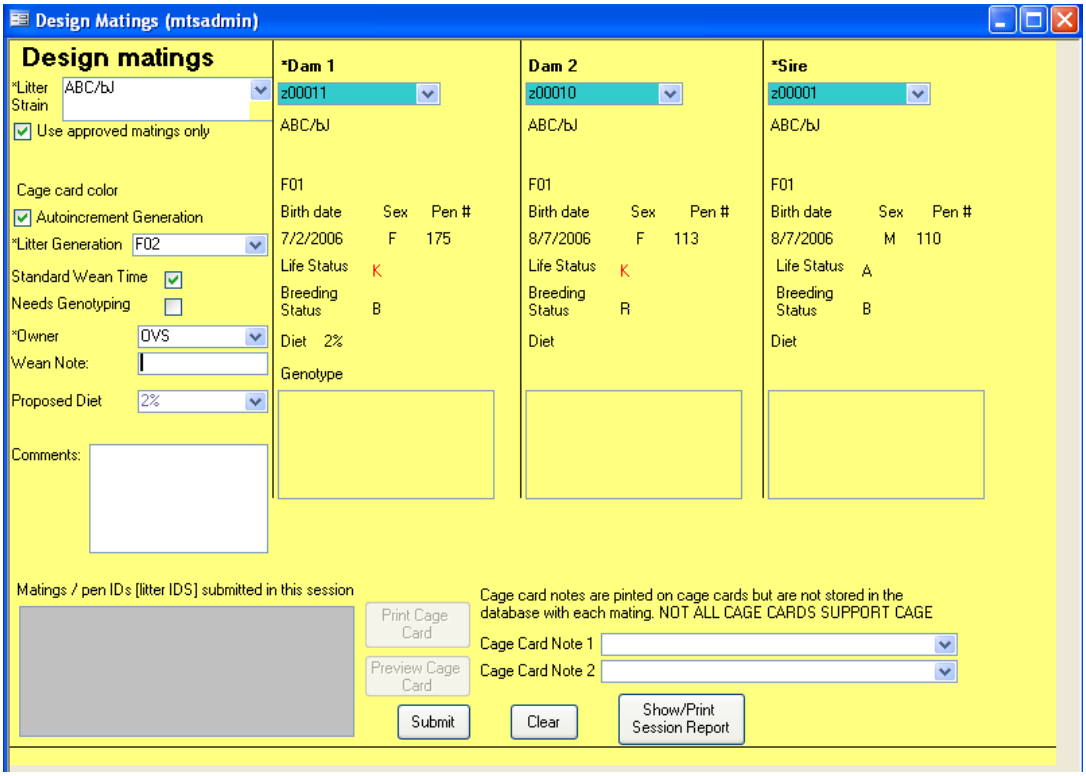


Figure 8-3 Form: Design Mating

Matings can be set up “on paper” before they are implemented in the mouse room. The mating information may be printed on a cage card to be used by the mouse room workers. Once the mating is set up in the mouse room, JCMS must be updated using the *Activate* mating form described below.

Use the **Design Matings button** to open the Design matings form. Use the blue-green drop down boxes to select the dam(s) and sire. Dam2 is optional. It is not possible to enter the mating date at this point.

There are a number of “proposed” data items that can be entered on the design mating form (such as proposed diet). These items are stored in the database but not associated with the mice until the mating is activated (using the Activate mating form). The “proposed” data items allow printing out the information to bring to the mouse room. When the mating is selected for activation, the “proposed” items become the defaults so they don’t have to be reentered unless a change has been made.

Click on the Submit button to add the mating into the database. If there are no error messages, JCMS will automatically generate a mating number and proposed pen ID number. The mating number and proposed pen ID number will be listed in the session box.

After the submit is successful, the **Print Cage Card button** will be activated. Printing cage cards is an optional step. The card printed will show the mating that was just submitted and its proposed pen ID number.

The **Clear button** is used to clear all the fields at once.

8.5 Activating a Mating

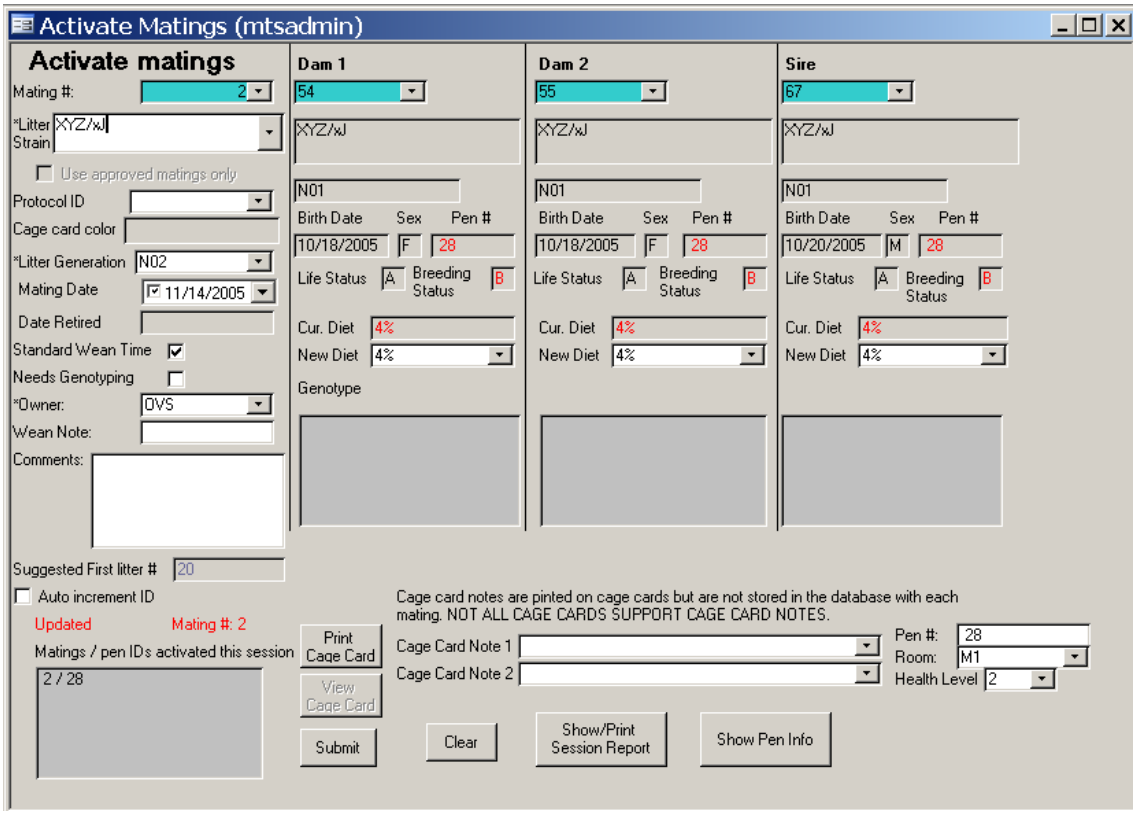


Figure 8-4 Form: Activate Mating

Once the matings have been set up in the mouse room, use the **Activate Mating** button to enter the mating date and any changes. First select the mating ID number and the mating as it was set up will appear. If a different dam or sire was used, they can be changed using the drop down boxes.

When a mating is activated, the diets for each mouse in the mating will be automatically updated according to the new diet combo box. The default new diet will be the **proposed diet** specified with the design mating form. The diets for each mouse can be changed by selecting a new diet from the combo boxes if the **proposed diet** is not the actual diet.

The suggested pen ID will be used to create a new pen group record and the three mice will be moved into it. The room # and health level will have to be entered before this step can be completed. The mating date will be used for the date established for the pen. You will be asked to confirm that you want to add the pen group record. All fields that were changed will be displayed in red after a successful submit. The mating ID and pen ID will also be added to the session box.

There is no way to delete a mating. If three completely different mice were used, use the Add Mating form to create this as a new mating.

8.6 Add a Mating

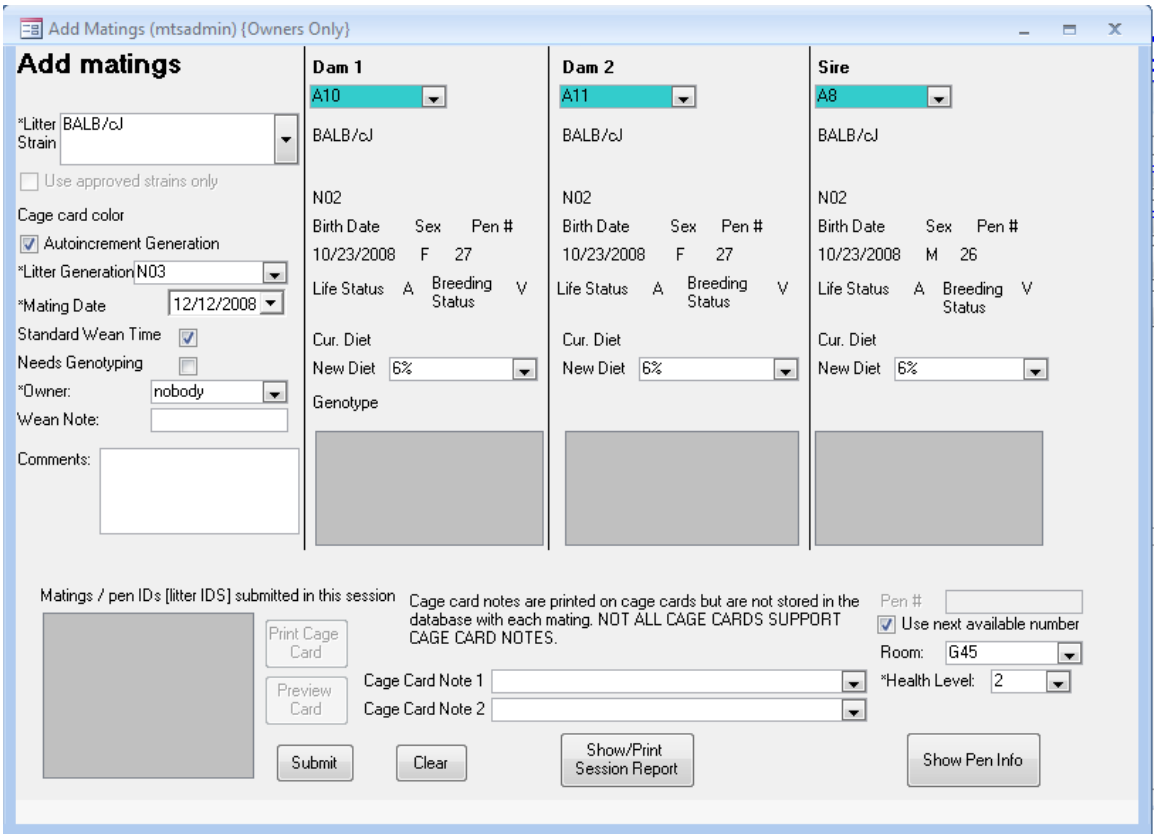


Figure 8-5 Form: Add Mating

The Add Matings form allows designing and activating a mating on one form. This form is useful for those who set the matings in the mouse room and then want to come back to the computer to enter the data or for those who use laptops or other computers in the mouse room.

On this form, there is a check-box on the lower right hand side that, when checked, tells JCMS to put the mice in this mating in the next available pen number. If the check box is un-checked, then a pen ID number must be manually entered in the pen number box.

8.7 Edit a Mating

Edit an existing mating using the Edit mating form. With this form it is possible to select new mice (dam1, dam2, and sire) and change the basic mating information. A duplicate or new cage card can be printed from this form.

NOTE: If a new dam1, dam2, or sire for a mating is selected, it may be necessary to do other cleanup work. For example, the mouse that was in the mating and the new dam and/or sire, may need to have their breeding status and diets changed (use the edit mouse form). It may also be necessary to use the move mice form to move the replaced mice to appropriate pens. If a pregnant dam is moved out of a mating, the pedigree information for her litter may be lost.

The edit matings form does not automatically make changes to any of the mice in the mating (unlike the activate mating form which changes breeding status, diet, and pen automatically); however, a warning will display, telling exactly which mice to make changes to.

8.8 Design Matings to be Retired

Matings can be retired in two steps. First, on the computer decide which matings to retire (design step). Next go to the mouse room and do the work, then come back to the computer and actually retire the matings on the computer. Or, the *design* step can be skipped.

The design retire matings form allows setting up a work list of matings to retire without actually making changes to the primary mating information in the database. The database stores **proposed** information in the mating table. When this form is used, it only updates the **proposed** fields in the database. Thus, no changes will be seen when a query for mating or mouse information is made. The idea is to set up a work report (by printing out copies of the Design retire matings forms as you work). Then, after the work has been completed in the mouse room, use the Retire matings form to actually update the primary information in the database. When selecting a mating to retire, the proposed information (entered previously in the Retire design mating form) will appear as the defaults in the Retire matings form. Any changes can be made at this point (to reflect what really happened in the mouse rooms) before submitting the changes to the primary information in the database.

8.9 Retire a Mating

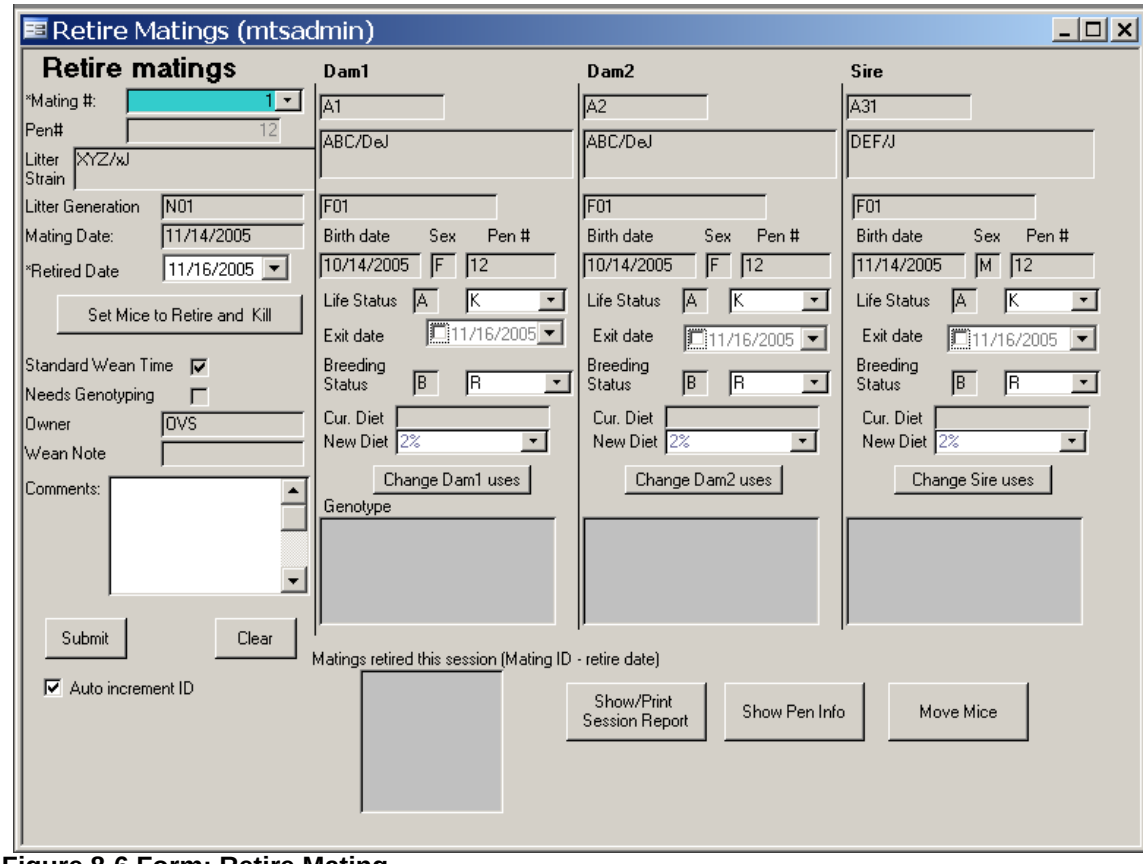


Figure 8-6 Form: Retire Mating

Once the matings have been retired in the mouse room, the date retired must be entered into JCMS. Use the **Retire Matings** button. Select the mating number from the blue/green box. Only matings that have not already been retired are available for selection. All information about this mating will display as soon as the cursor is moved out of this box by tabbing or clicking elsewhere. Enter the date retired. The dam1/2 and sire life status can be changed to K by using the pull down menus. Similarly, the breeding status can be changed to R for retired breeder and a new diet can be selected. No changes occur until the **Submit button** is clicked.

The retire mating form also has a Set Mice to Retire and Kill button which sets the mouse life status to killed (K) and the mouse's breeding status to retired (R). Using this button also sets the date killed to the date retired.

8.10 Working with Matings using a Handheld

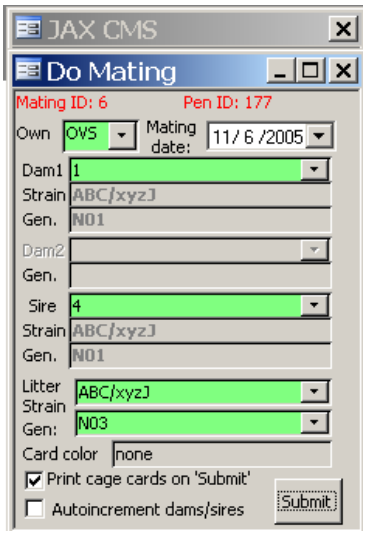


Figure 8-7 Handheld Form: Pair Mating

Matings can be created using handheld computers by scanning or entering pen ID numbers. Two types of matings are available, pair or trio. A cage card can optionally be printed showing the pen ID, Mating ID and suggested litter numbers. The automatically assigned pen ID and Mating ID will also be shown at the top of the form.

9 Litters

JCMS associates litters with matings. Each litter must have a unique litter ID number associated with it. JCMS can generate litter ID numbers, or you can use your own litter number scheme.

All litter forms except those for handhelds show a list of all litters currently associated with the selected mating.

9.1 Automatic Litter Number Generation

JCMS may be set up by the Administrator to automatically generate litter numbers. Once this function is set on, all JCMS users will have automatic litter numbers generated. Note, however, JCMS does not enforce which litter numbers are used (even if it generates a set of numbers); it is up to you to when you enter a new litter in JCMS to decide which number to use. If you prefer to use your own litter number series, then turn off the JCMS litter number generator.

9.1.1 Turning auto litter numbering on or off

The Administrator controls automatic litter numbering from the Administrator button bar, using the button for *JCMS Setup Variables*. The variable called MTS_AUTO_LITTER_NUMS can take the values “on” or “off”.

9.1.2 Setting the number of litter numbers that are generated for each mating

JCMS increments its internal litter number counter by a value specified in the *JCMS Setup Variables* table. Set how many litter numbers should be allocated to litters by changing the value of this variable. NOTE: to prevent any confusion, it is best to set this number when first starting to use JCMS and then not changing it. We recommend that this number be set to 10 unless you really have long breeding pairs that you track. The number of litter numbers that are generated is set by the JCMS Setup Variable called MTS_NUM_LITTER_NUMS (from the Administrator button bar, click the JCMS Setup Variables button).

Changing the number of litter numbers can create minor confusion (but no date problems) because the add and edit litter forms show the range of litter numbers associated with each mating. The range of numbers is calculated from the first suggested number plus the number of numbers generated (as specified in the MTS_NUM_LITTER_NUMS variable). The only point of confusion will be on the litter forms that may show an incorrect range for matings that were allocated a different number of litter numbers (if this is confusing, don’t worry, just don’t change the MTS_NUM_LITTER_NUMS variable very often).

9.2 Which Litter Forms to Use?

Multiple step process:
Using this approach, first identify the litters from the mating and record them in JCMS (Add Litter button). When the pups are sexed and/or tagged, add the number of male and female pups to the litter record (Edit Litter button). Next use the Wean report (Print Wean Report button) to get a listing of litters that should be weaned during a particular time period. Finally, add the weaned pups and their wean and tagging dates to JCMS (Add Mice at Weaning button).

One step process:
Add the litter to the database when the mice are weaned by using the Add Litter w/ Pups button. This form allows adding all of the litter information AND adding the pups as individual mice in one step.

Handheld forms:
Use the Add Litter w/mice choice from the handheld forms to enter a new litter at weaning. This form will create a litter record and then create the newly weaned mice in pens. It will not enter the wean date in the litter record. Use the Handheld Wean or Wean and Exit form to enter the wean date into the litter record.

9.3 Adding Litters

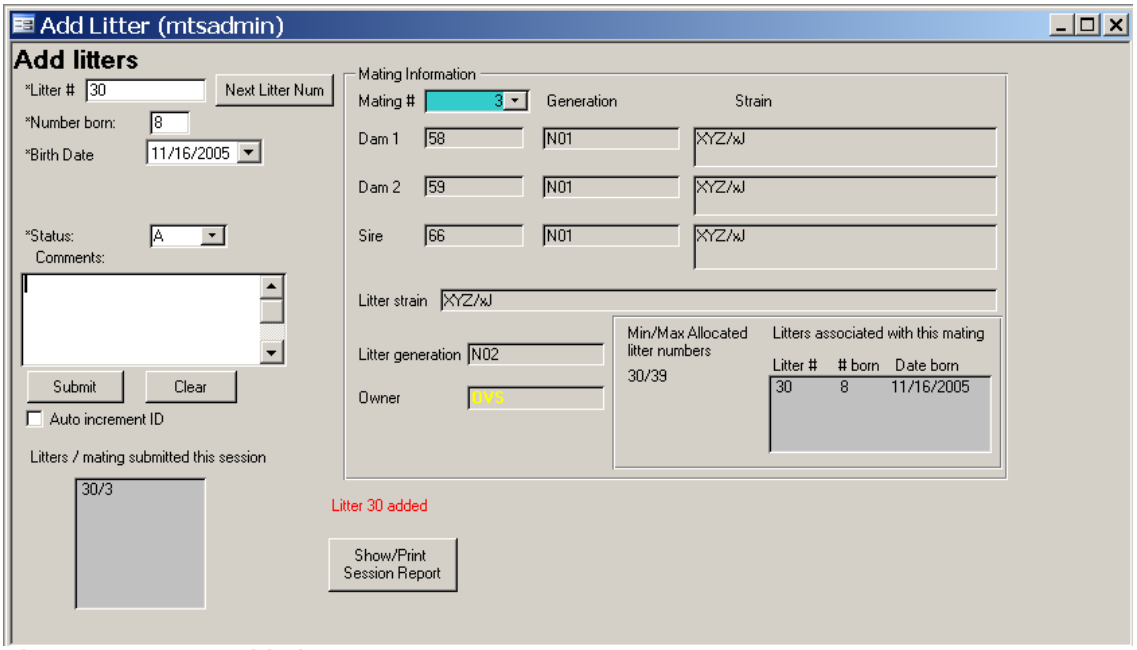


Figure 9-1 Form: Add Litter
To add a new litter, specify the Mating ID number. The mating information will show on the screen. Type the litter number into the litter number box or use the Next Litter Num button. Litters that were successfully added will be listed in the session box along with their mating ID number.

9.4 Wean Report

The **Print wean report** button on the main button bar will open the request wean report form. It is used to request a listing of litters that have not yet been weaned by returning all litters with a status of "A" and no recorded wean date. A start date is entered to eliminate from the list all litters that will be too young on that date for weaning. Litters will be selected that are 18 or more days old (for the standard wean time) or 28 or more days old (for long weans) on the start date. The resulting list may also be limited by selecting only certain mouse owners.

The report is available in three formats: sorted by strain, sorted by room and strain, and ready to export to Excel.

The report is designed to be printed in **landscape** format. If the print preview shows the report in portrait format, change it as follows. Select from the menu bar: File – Page Setup. Click the page tab and select landscape.

9.5 Editing Litters

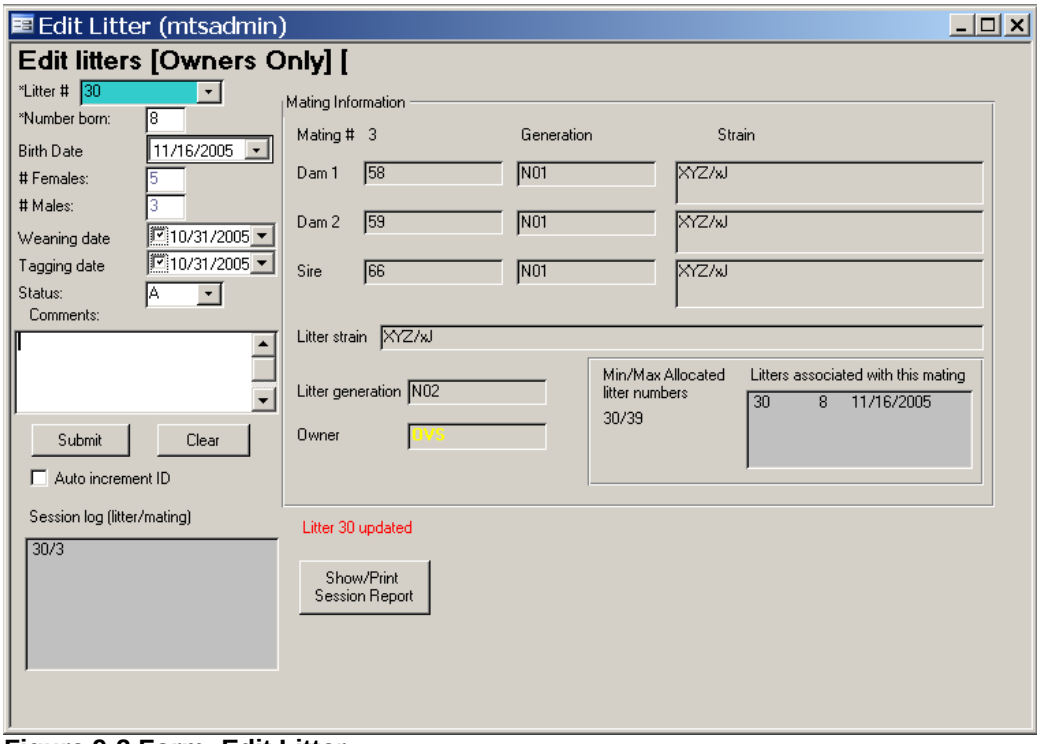


Figure 9-2 Form: Edit Litter

Click on the **Edit Litter** button to open the form. Type in or select the litter number from the drop down list. When the cursor leaves the litter number box (either via tabbing out of the box or by using the mouse to go to another box,) the litter data will appear on the form.

The wean date and the tag date are kept in synch on the edit litter form by default. The default can be overridden by selecting different dates. JCMS just tries to make it easier on data entry by automatically filling in the tag date from the wean date (and vice versa).

No changes are made to the database until the **Submit button** is clicked.

The **Clear button** clears all edit fields in order to start over. However, if the clear button is pressed by accident then recover simply by clicking on the litter number box and then moving the cursor back out of the box (to redo the query).

When pups are weaned, this form is used to enter the number of males and females, weaning date and tagging date. Only an owner or owner's secretary has permission to use this edit form.

9.6 Wean Litters

Use the **Add Mice at Weaning** button to open the Add a new mouse at weaning form. Each newly weaned mouse is entered individually. The wean and tag dates for the litter may also be entered on this form. See the Adding Mice at Weaning section for a description of this form.

9.7 Adding Litters with Pups at Weaning

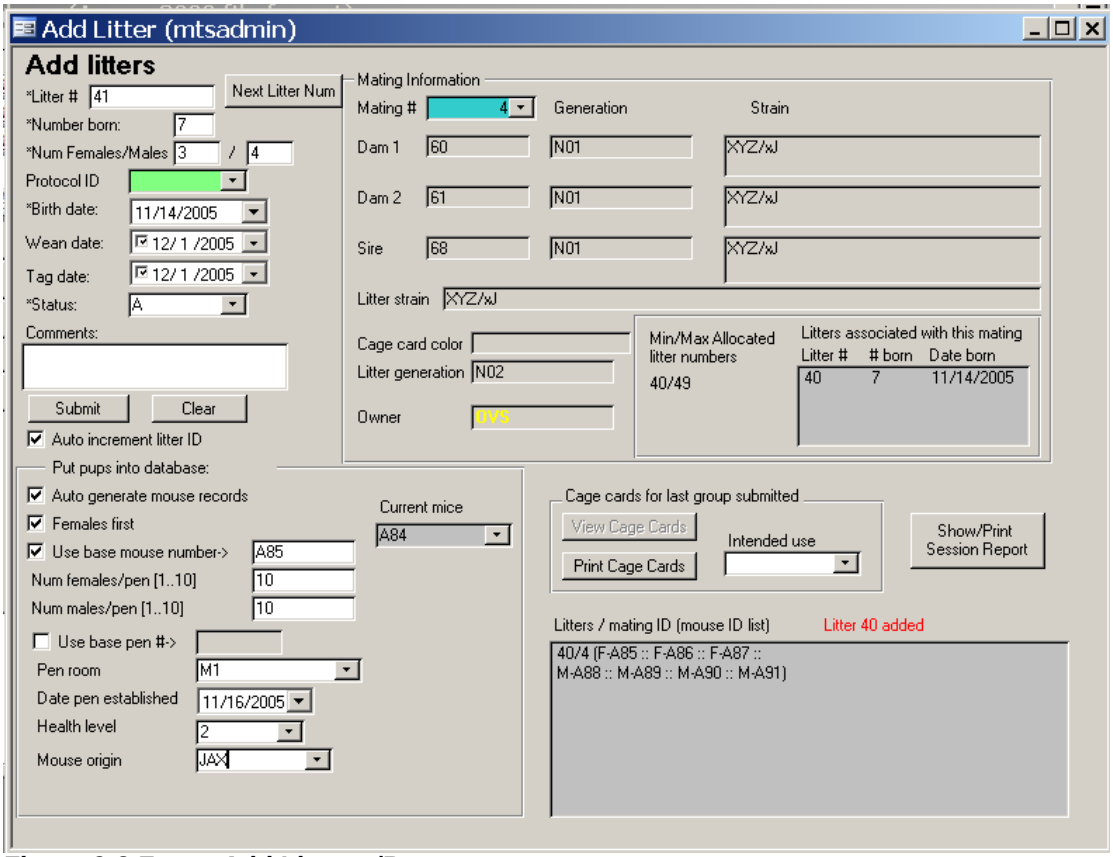


Figure 9-3 Form: Add Litter w/Pups

This form is used to add the litter into JCMS and all pups also as tagged mice in one action. Use the **Add Litter w/pups** button. First select the mating, then enter the litter number by typing it or using the Next Litter Number button. Enter the rest of the litter information. The current mice drop down box is there to help determine the last mouse ID number used. Selecting a mouse number will cause the next number in the sequence to be placed in the base mouse number box. Pen ID numbers will be assigned automatically and a starting (base) pen number may be specified. If any prefixes should be used on the numbers, enter the prefix as part of the base number. Print the cage cards before adding another litter. The intended use field will print on the cage cards, but not be entered into JCMS.

9.8 Weaning Mice using a Handheld

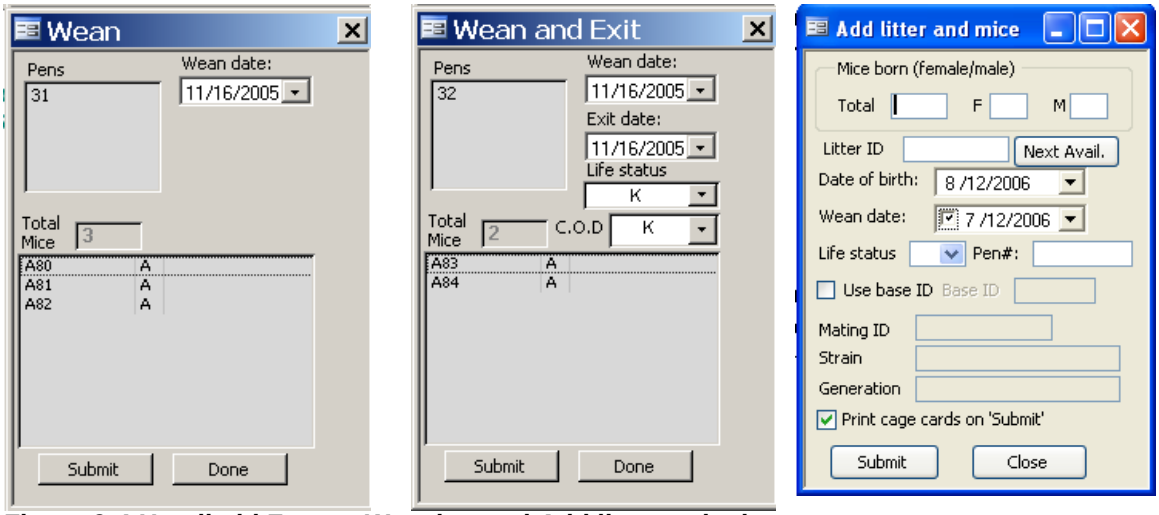


Figure 9-4 Handheld Forms: Weaning and Add litter and mice

Handheld Forms: Weaning and Add litter and mice

These three forms are provided for using handheld computers in the mouse room for weaning mice. Scan the pen ID of a mating pen and select **Add litter w/mice** from the handheld main menu. This will open the Add litter and mice form. Use the **Next Avail.** button to select the litter ID. Enter the litter information and a Base ID number (ID number to start with) for the new mouse records. Printing cage cards will provide the proper labeling for the new pens. Submit will create a new litter record for this mating, new mouse records for each member of the litter and new Pen Group records. This form does not enter the wean date into the litter record.

To enter the wean date into the litter record, scan one of the new pens and select **Wean mice** from the handheld main menu. Enter the wean date and click submit. This will enter the wean date for the whole litter and does not need to be repeated for any other pens the litter may have been split into.

A second method of entering the wean date is to enter it when the mice in the pen are given their exit date. Scan the pen ID and select **Wean and Exit** from the handheld main menu. Enter the wean date, exit date, life status and cause of death (C.O.D.). If the mice in the pen have already had a wean date entered, it will not be changed, so this form can also be used just to exit mice.

10 Plug Dates and Pregnancy Checking

Vaginal plugs form following copulation. The plug date table is used to record the date a plug is observed and associate it with a dam and mating. Later, the plug date may be marked obsolete to indicate the dam has given birth or that conception did not take place. Over time, a dam may accumulate a series of plug dates.

Plug dates are used to generate several reports containing the following types of information:

- Stage of pregnancy (lists dams by strain and date of plug).
- Work report: dams to check for plugs (lists dams by strain that currently have no plug)
- Plug date history for mice or matings (lists all the dam's plug dates)

Pregnancy checks:

- Plug Date work report: dams to check for conception/pregnancy (lists dams by strain and date of plug).

- Pregnancy Check work report: for those not using plug dates, this report lists all matings with no litter in the pen and ignores any plug dates.

10.1 Add Plug Date

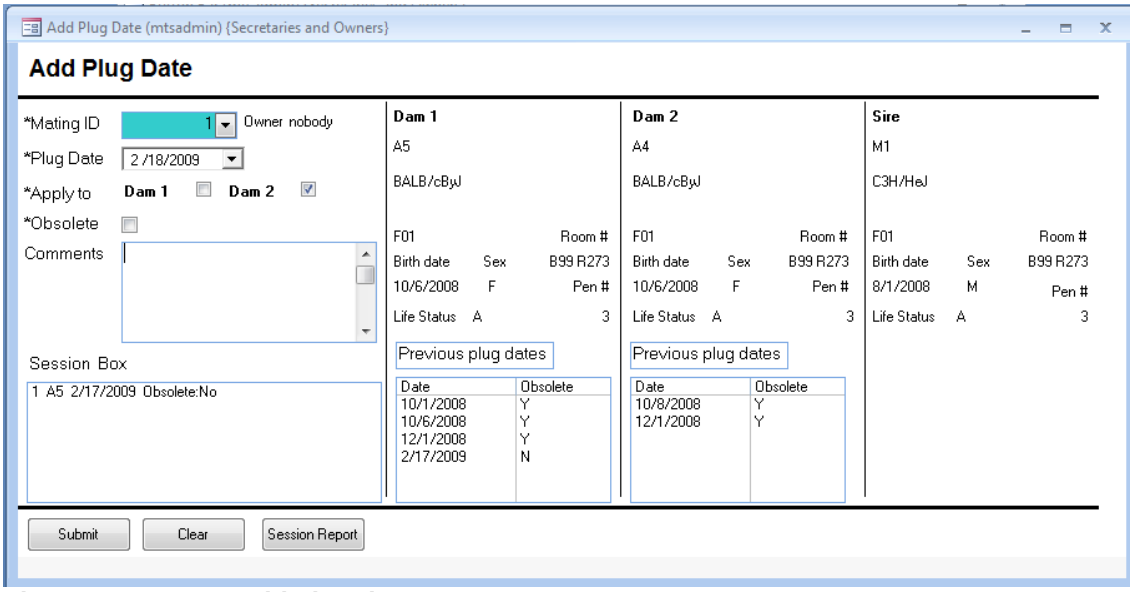


Figure 10-1 Form: Add plug date

The plug date is associated with a particular dam in a specific mating. Only matings that are active (not proposed or retired) are listed as choices. To add the same plug date to both dam 1 and dam 2 at the same time, check both apply to boxes. If a dam has previous plug dates that are associated with a different mating, they will not be displayed on this form.

10.2 Edit Plug Date

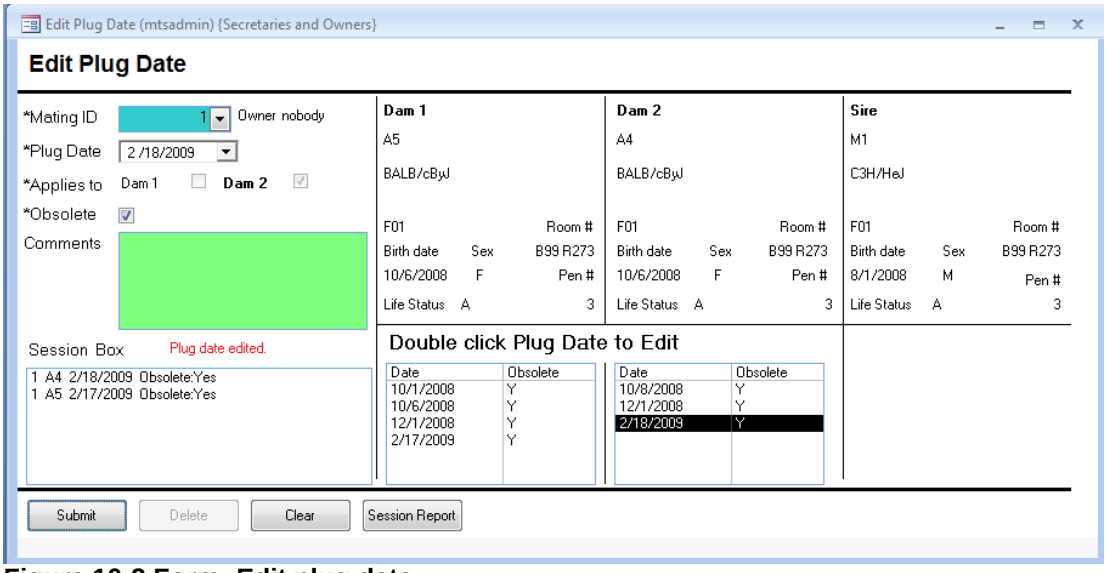


Figure 10-2 Form: Edit plug date

Only plug dates that are associated with an active mating (not proposed or retired) may be edited or deleted. Select the plug date to edit from the list below the dam by double clicking on it. Once the specific plug date record is displayed on the left side of the form, the comments, obsolete

check box, and plug date may be changed. Mark plug dates obsolete to keep the dam from being listed on the plug date and pregnancy stage report. A dam's plug dates must all be obsolete for her to be listed on the plug check report.

To delete a particular plug date, double click it on the dam's plug date list. The delete button will become an available choice. If any editable field is changed on the form (plug date, obsolete, or comments), the delete button will no longer be a choice. This is to prevent accidentally deleting instead of editing a plug date.

10.3 Plug Date and Pregnancy Check Work Reports

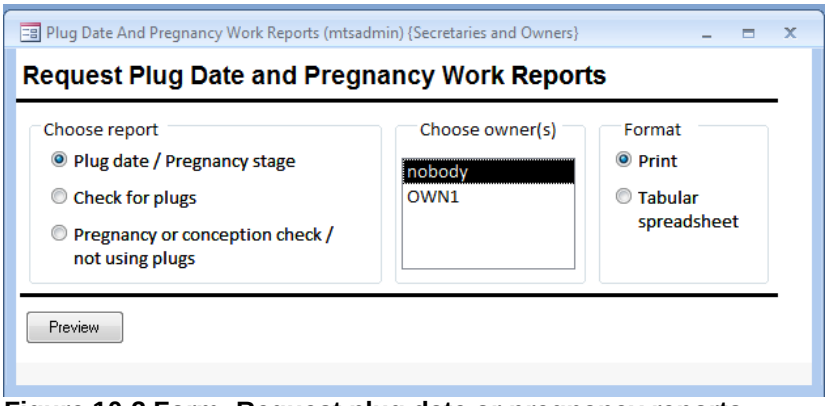


Figure 10-3 Form: Request plug date or pregnancy reports

Three different reports are selected using this form. Any report may be filtered by owner. The tabular spreadsheet format may be exported to Microsoft Excel. If Microsoft Office 2007 gives the message "Excel found unreadable content…" answer "yes" to recover the contents. No data will be lost.

10.3.1 Plug Date / Pregnancy Stage Report

Plug Date / Pregnancy Stage 23-Oct-09

Mouse ID	DPC	Generation	Life Status	Owner	Mating ID	Mating date	Room	Pen ID
Strain: B6D2F1/J								
Plug Date: 10/23/2009								
F0001	0.5	F02	A	nobody	8	10/23/2009		113
F0002	0.5	F02	A	nobody	9	10/23/2009		114
F0003	0.5	F02	A	nobody	10	10/23/2009		115
F0004	0.5	F02	A	nobody	11	10/23/2009		116
Plug Date: 10/9/2009								
F99-03	14.5	F01	A	nobody	5	10/9/2009		107
F99-04	14.5	F01	A	nobody	4	10/6/2009		106
Strain: BALB/cByJ								
Plug Date: 10/6/2009								
Litter106	17.5	F02	A	nobody	6	10/9/2009		109
Litter106	17.5	F02	A	nobody	7	10/9/2009		109
Litter106	17.5	F02	A	nobody	7	10/9/2009		109

Figure 10-4 Sample plug date / pregnancy stage report

This report is sorted by strain, plug date, room, and pen ID. It lists for active matings, all plug dates that are not marked obsolete. In the sample report shown above, dams A2, F3, and F1 are listed several times because they have multiple plug dates that are not marked obsolete. For this report to be accurate, all old plug dates must be marked obsolete.

Use this report to determine the pregnancy stage by calculating the number of days between today and the plug date. Use this report to list dams that should be checked for conception, pregnancy, or litters based on their plug date.

Plug Date / Pregnancy Stage

Strain	Plug Date	Mouse ID	Mating #	Mating Date	Room #	Pen #	Generation	Status	Owner
BALB/cByJ	12/5/2008	A2	7	10/8/2008		15	F01	A	nobody
BALB/cByJ	12/1/2008	A3	7	10/8/2008		15	F01	A	nobody
BALB/cByJ	10/14/2008	A2	7	10/8/2008		15	F01	A	nobody
BALB/cJ	12/6/2008	F3	4	8/25/2008	B102 R55	10	F02	A	nobody
BALB/cJ	12/3/2008	F4	6	10/10/2008		12	F02	A	nobody
BALB/cJ	12/3/2008	F3	4	8/25/2008	B102 R55	10	F02	A	nobody
BALB/cJ	12/2/2008	F1	5	8/27/2008	B99 R273	11	F02	A	nobody
BALB/cJ	11/30/2008	F1	5	8/27/2008	B99 R273	11	F02	A	nobody
BALB/cJ	10/6/2008	F3	4	8/25/2008	B102 R55	10	F02	A	nobody
FVB/NJ	7/14/2009	Old2	9	3/1/2008		19	N02	A	nobody

Figure 10-5 Sample tabular spreadsheet format plug date / pregnancy stage report

10.3.2 Plug Check Work Report

This report lists all active matings where one (or more) dams have no plug (i.e. all the dam's plug dates are marked obsolete or it has no plug dates). The report is sorted by strain, room, and pen ID.

Plug Check - Dams with no Plug

Pen #	Mating #	Mating Date	Dam Generation	Owner	Dam ID
Dam Strain	**BALB/cByJ**				
Room	**B99 R273**				
3	1	10/6/2008	F01	nobody	A5
3	1	10/6/2008	F01	nobody	A4
Dam Strain	**BALB/cJ**				
Room					
16	8	10/4/2008	F03	nobody	New3
Room	**B102 R55**				
8	2	8/20/2008	F02	nobody	F5

Figure 10-6 Sample plug check report

10.3.3 Pregnancy Check Work Report

This report ignores plug dates. It lists active matings that have no litter in the pen. A mating has no litter if all litters associated with the mating have a wean date or it has no litter records associated with it. A litter that has a status other than "A" for alive will be ignored since a litter with a status such as born dead might not have a wean date.

Pregnancy Check - Matings with no Litter

Pen #	Mating #	Mating Date	Litter Generation	Owner	Dam 1
Litter Strain BALB/cJ					
Room					
12	3	8/22/2008	F03	nobody	F4
16	8	10/4/2008	F03	nobody	New3
Room B102 R55					
10	4	8/25/2008	F03	nobody	F3

Figure 10-7 Sample pregnancy check work report

10.3.4 Plug Date History

Use the Mouse Query or Mating Query to obtain a list of all plug dates recorded for selected dams or matings.

11 Genotyping

11.1 How Does Genotyping Work?

Any mouse may have several genotypes. Each genotype consists of a gene and the two alleles that were found for that gene. In JCMS, alleles are associated with specific genes or gene classes. The JCMS forms that display alleles that may be associated with a gene use both criteria (association to the gene and association to the gene class) to come up with a list of alleles that may be associated with a given gene.

The Administrator is responsible for setting up the available genes, alleles and gene classes. See the section on initializing CV tables for genes, alleles and gene classes for more information on how these are set up.

The following Gene Class values are preset, but may have been changed or added to by the Administrator.

Class name	*Comments*
E	endogenous
MKO	multi allele knock out
MTG	multi allele transgene
TG	trans gene
KO	knock out
KI	knock in
Floxed	tissue specific knock out
CTK	Combination transgene + KO

11.2 Adding a Genotype to a Mouse

Add Genotype

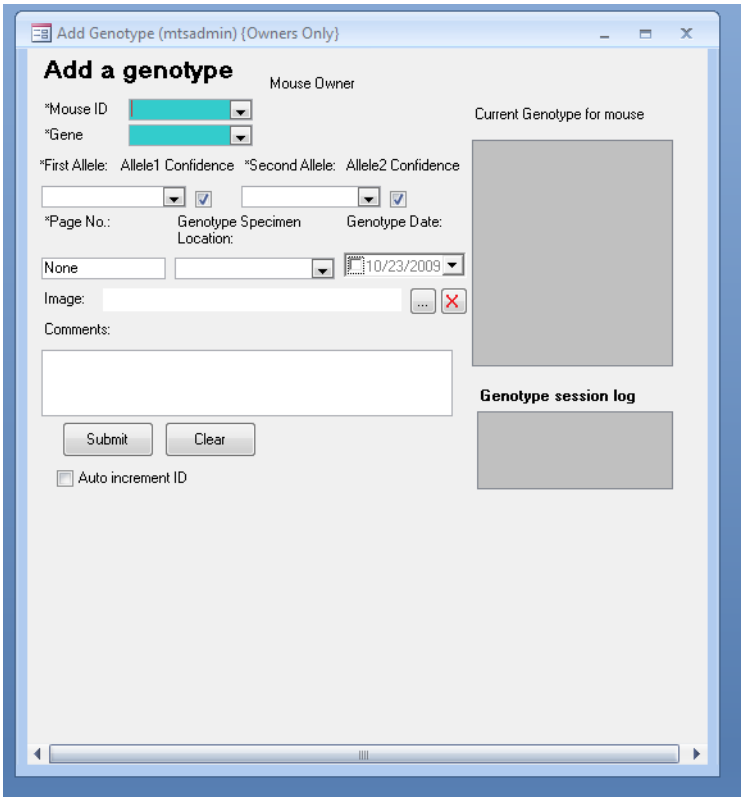


Figure 11-1 Form: Add Genotype

Click the **Add Genotype** button. To add a new genotype, specify the mouse ID. The current genotype will show on the screen. Next select the gene. Now the alleles that have been set up for the chosen gene will appear as choices in the first and second allele drop down boxes. The First allele and page number are required fields. If there is no page number, enter "None" in this field.

If the allele drop down boxes are blank, make sure a gene has been chosen. If they are still blank, have the Administrator add the alleles to the controlled value tables.

You may choose an image to associate with the genotype by clicking the ("…") button to the right of the image box. This will display a file browse window where you may select the image. When an image is associated with a genotype, it is copied to the directory specified by the JCMS Setup variable JCMS_DATA_FILE_DIRECTORY. This is the root directory where all JCMS data files are stored and it needs to be set before using this feature. Typically you would set the value of this variable to the directory where JCMS is installed, for example:

C:\Program Files\The Jackson Laboratory\JAX-CMS\data

You may remove the image by clicking the image delete ("X") button. You may update this image after you have added the genotype on the Edit Genotype form (see Section 11.3 below.)

11.3 Editing a Mouse's Genotype

Edit Genotype

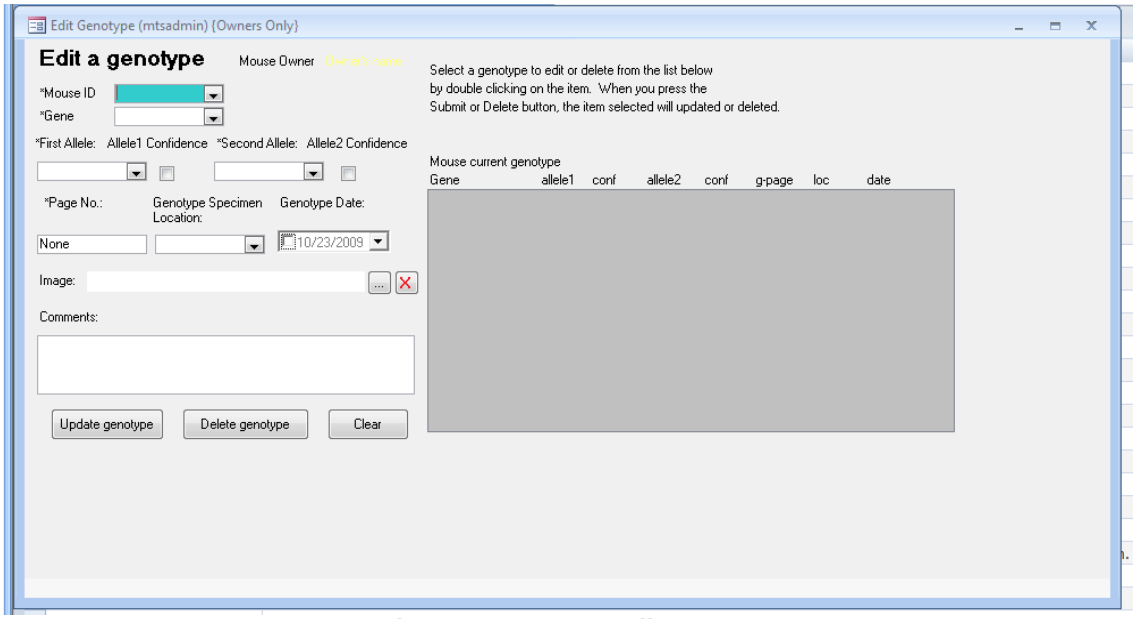


Figure 11-2 Form: Edit Genotype

Click the **Edit Genotype** button. To edit a genotype, first select the Mouse ID. Then all the current genotypes for that mouse will show in the list box on the right side of the form. Double click on the genotype to be edited or deleted and that information will appear in the boxes on the left side of the form. Click the Delete genotype button to remove this genotype. Make changes to the information in the boxes and then click Update Genotype to edit it.

You may add or update an image associated with the genotype by clicking the ("…") button to the right of the image box. This will display a file browse window where you may select the image. When an image is associated with a genotype, it is copied to the directory specified by the JCMS Setup variable JCMS_DATA_FILE_DIRECTORY. This is the root directory where all JCMS data files are stored and it needs to be set before using this feature. Typically you would set the value of this variable to the directory where JCMS is installed, for example:

C:\Program Files\The Jackson Laboratory\JAX-CMS\data

You may remove the image by clicking the image delete ("X") button.

11.4 Adding a Genotype to a Group of Mice

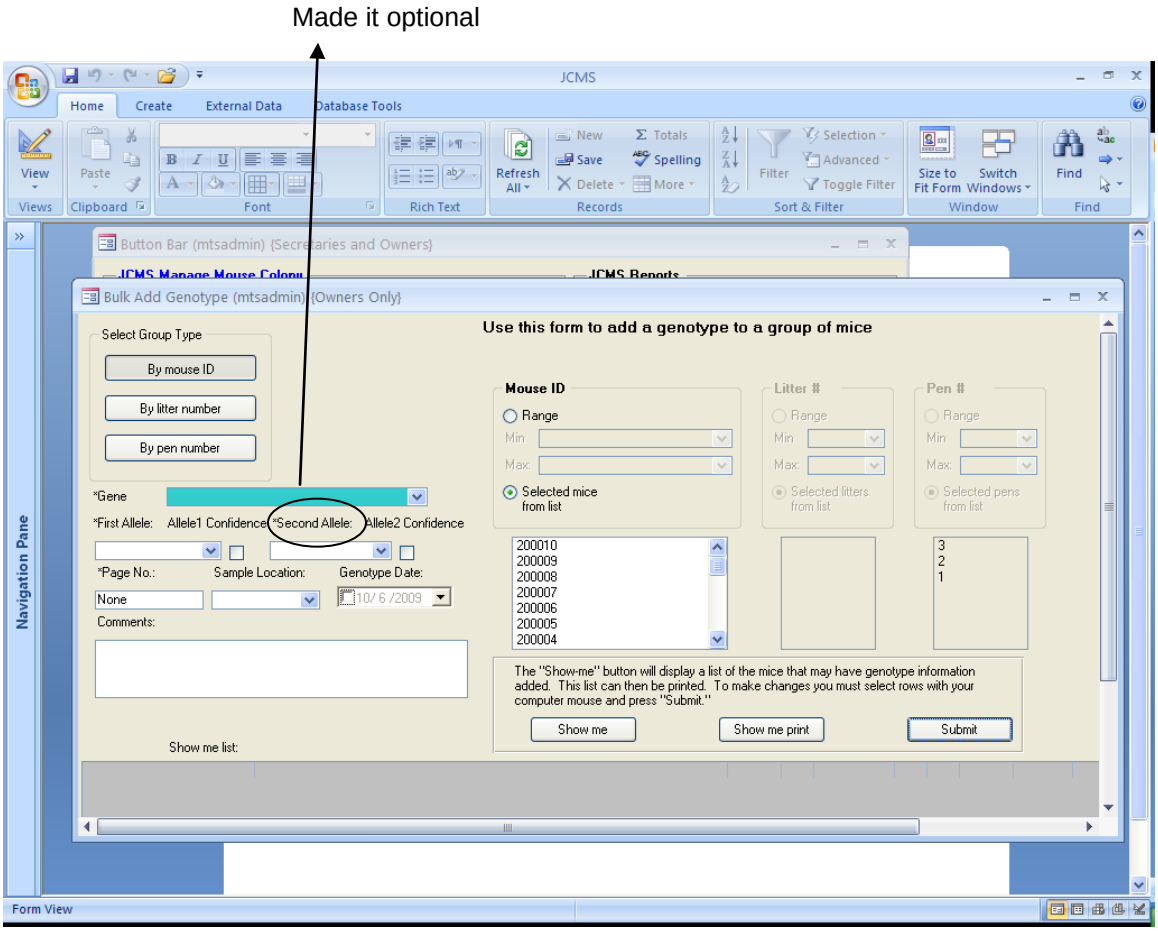


Figure 11-3 Form: Bulk Add Genotype

Click the **Bulk Add Genotype** button. Mice may have an identical genotype added to a group. The group may be selected by mouse ID, Litter ID, or Pen ID. Click the **Show Me** button to see the list of possible mice for the add. Enter the genotype information on the left side of the form in the same fashion as on the Add Genotype form. Select the mice to have the genotype added by clicking on them in the show me box. Hold down the shift key to select a range or the ctrl key to select one at a time. Any mouse that already has this gene will not have it added again or changed. These mice will have “Y” listed in the “Already typed for gene?” column.

11.5 Genotype string format

The administrator can now configure how genotype strings are displayed and if the confidence level is shown or not. Three new setup variables are used to indicate the string's appearance.

The default display of a genotype is: gene[AB-Y/CD-N], where -Y and -N represent the confidence for each allele and the allele names in this example are AB and CD.

The setup variables for the confidence level: JCMS_ALLELE_CONF_HIGH and JCMS_ALLELE_CONF_LOW may be set to a value that is 8 characters or less. The default values are -Y and -N.

The setup variable JCMS_ALLELE_GENE_SEPARATORS specifies one character that is used before the alleles and one at the end. The default is []. If no characters are given, one space will be placed between the gene name and the alleles.

Note that the characters ‘ (single quote) “ (double quotes) ; (semicolon) and , (comma) are not allowed. Cage cards do not print the allele confidence levels.

Table 11-1 Examples of genotype strings

JCMS_ALLELE_ CONF_HIGH	JCMS_ALLELE_ CONF_LOW	JCMS_ALLELE_ GENE_SEPARATORS	RESULT
-Y	-N	[]	gene[AB-Y/CD-N]
blank	(?)	blank	gene AB/CD(?)
blank	blank	:	gene:AB/CD
(y)	(n)	<>	gene<AB(y)/CD(n)>

12 Scheduling Procedures (Uses)

12.1 How do Mouse Uses Work?

Mice may be assigned various uses over time. JCMS uses the term “use” to refer to a procedure, protocol, test, experiment, examination, assessment, etc that was done with a mouse at a particular point in time. Some “uses” such as taking a weight measurement may be repeated several times over the life of a mouse.

Uses may have a use age that provides a projected date for the use. The projected date may be used to generate a report of work that needs to be done during a particular time frame. When the use is complete the actual date is entered and up to 10 fields are available for entering data results (text format).

If the “mouse uses” system does not provide enough flexibility or data collection, use the Experimental Plan portion of JCMS instead. Experimental plans allow for user-designed experimental tests and metadata plus more complex scheduling.

12.2 Adding a Use to a Mouse

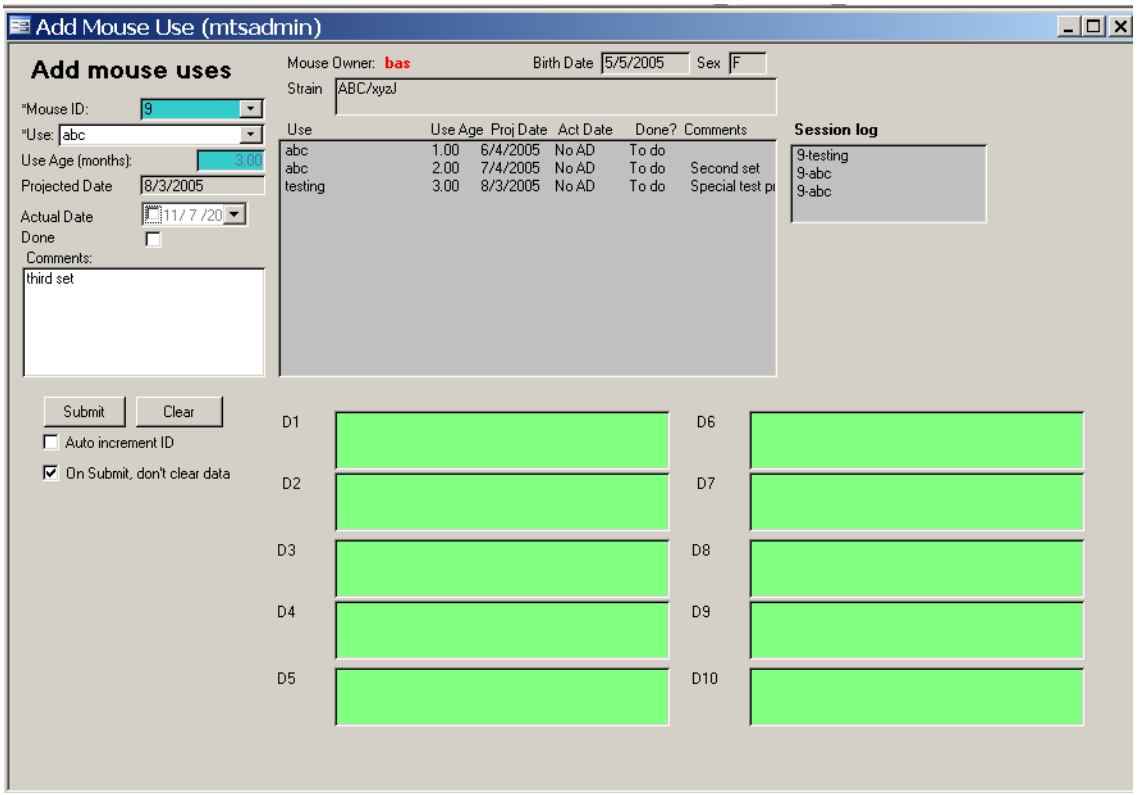


Figure 12-1 Form: Add Use

Click the **Add Use** button. Type the mouse ID into the blue-green box or pick it from the drop down list. Any current uses for this mouse will display in the list box. The use age and mouse birth date is used to calculate the projected date for this use. The use age in months may be entered as a decimal value such as 1.75 for approximately one month, 3 weeks. With each use, some information may be stored in the comment field. The D1 to D10 fields are provided to store results or other information associated with this use. It is the responsibility of the user to keep track of what the data in each field means – a suggestion is to include this as part of the data or comments. Ex: weight = 5gm or place "Weight in gm in D1" as part of the comments field.

12.2.1 Mouse Use Report

Use the **Print Mouse Use Report** button to request a listing of mouse uses that are not marked "done". Only mice with a life status of "A" for alive will be included in the list. The list may be limited to a single owner's mice. The results may also be limited to uses projected for before a specific date.

The report is designed to be printed in **landscape** format. If the print preview shows the report in portrait format, change by selecting from the menu bar: File – Page Setup. Click the page tab and select landscape.

12.3 Editing a Mouse Use

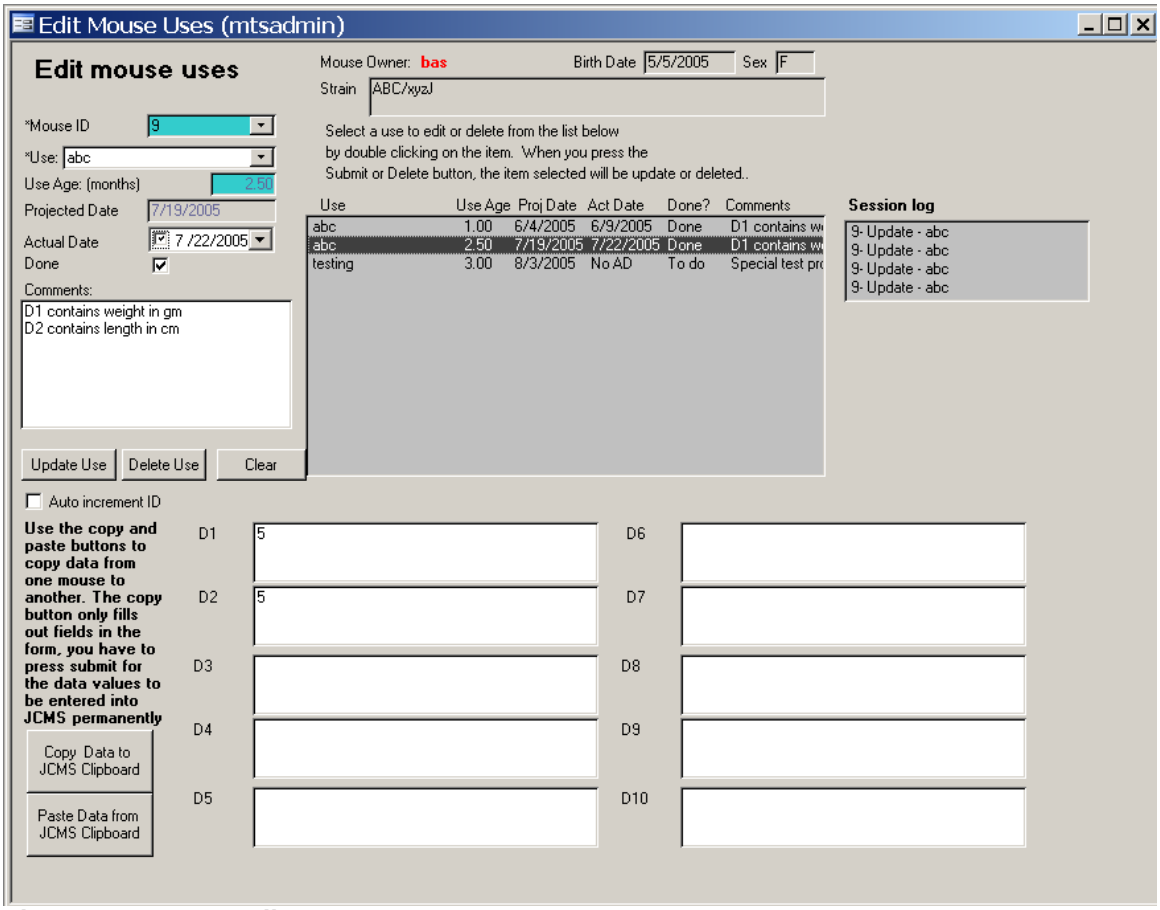


Figure 12-2 Form: Edit Use

Click the **Add Use** button. Type the mouse ID into the blue-green box or pick it from the drop down list. Any current uses for this mouse will display in the list box. To edit a use, double click on the use in the list box. The values for this use will appear in the white editing boxes. Update Use must be pressed for the changes to be saved or Delete Use to remove the selected use from JCMS. New uses cannot be added on the edit use form, only changes to existing ones.

Often data results are repetitive. When using the auto increment ID function, it is not possible to repeat the data for the next mouse as this is an edit form. To make repeat entry of the same data easier, there are two buttons on the form. Click on **Copy Data to JCMS Clipboard** before clicking the update use button. Select the proper use from the next mouse. Click the **Paste Data from JCMS Clipboard** and the D1 to D10 data fields will have the values from that previous mouse pasted into them. No other fields will be affected by this special paste. The clipboard will continue to contain these values so they may be pasted into a third, fourth, etc. mouse use. This clipboard cannot be used to paste these values into any other application.

12.4 Adding or Editing a Mouse Use for a Group of Mice

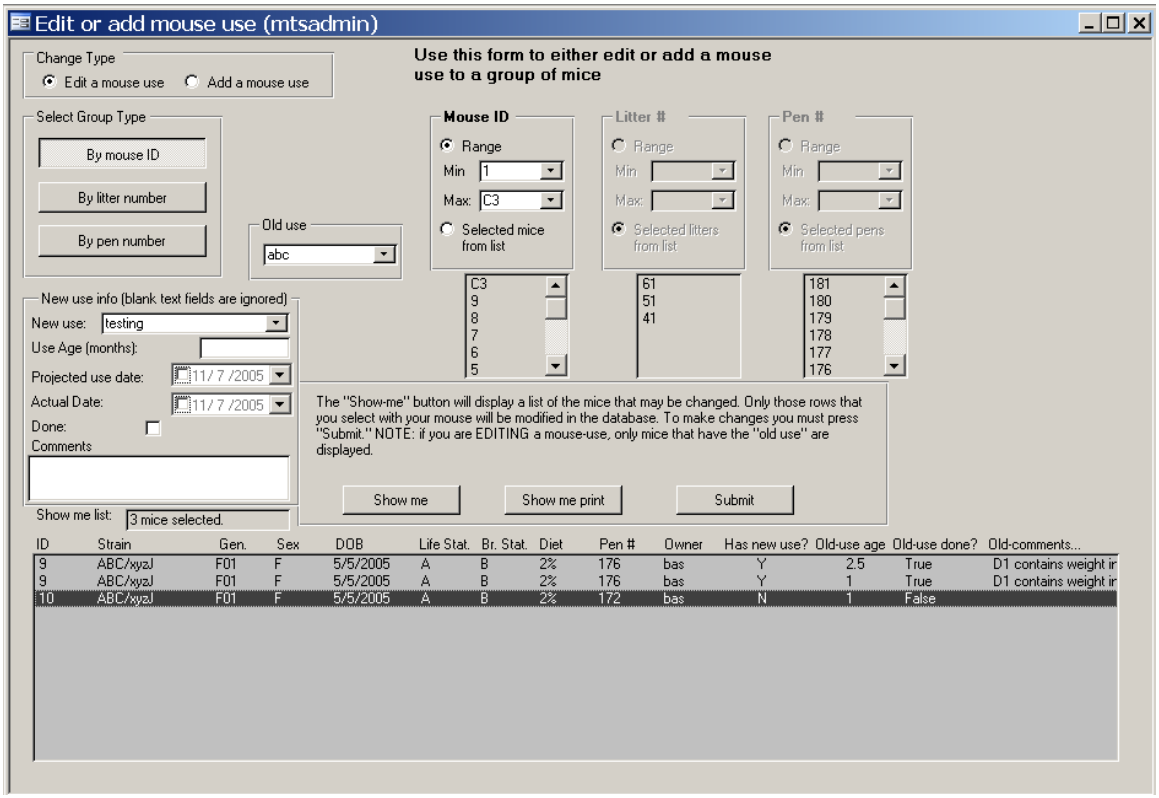


Figure 12-3 Form: Bulk Add or Edit Use

Click the **Bulk Add or Edit Use** button. This form allows both adding and editing mouse uses for a set of mice. Both functions cannot be done at once, first choose add or edit. The group may be selected by mouse ID, Litter ID, or Pen ID. Click the **Show Me** button to see the list of possible mice.

Edit use*:* specify an "*old-use*" (the *use* to be edited). Only mice that have the "*old-use*" will be displayed in the "*show-me*" list. Thus, it is possible to select mice to work on from one of the selection criteria list boxes, and potentially none will be displayed in the show-me list because they do not have the *old use*.

One mouse can be scheduled for the same use multiple times. Thus is it possible to see the same mouse listed multiple times in the show-me box. *Use* records can be distinguished from each other by looking at the old-use age. This form requires first selecting the mice to be modified and then choosing which of possibly many *use-records* to change.

NOTE: When editing a use, the contents of the comment field will replace any existing comments associated with the specific set of uses being edited. This may seem counter intuitive when thinking in terms of editing the comments. However, this edit function is an over-write function.

Add new use: select the "add a mouse use" choice and specify the mice to be operated on via one of the three selection criteria (mouse ID, pen, or litter). It is valid to add the same use many times for one mouse.

13 Queries

Some useful queries within JCMS are pre-packaged into reports. The Colony Summary Report is one of these.

To invoke it click on the **Colony Summary Report** button on the main button bar.

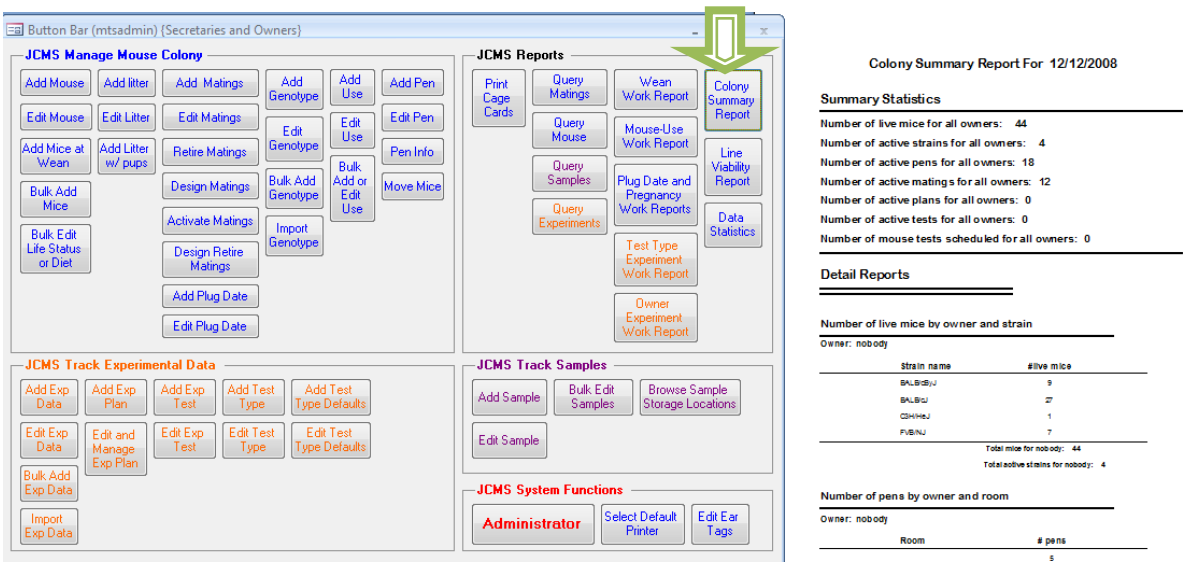


Figure 13-1 Colony Summary Report

The Colony Summary Report function produces a report that summarizes the state of the colony in a number of important areas. The report presents the information at a global level and additionally breaks it down in a detailed view by owner.

The report displays:

- total number of live mice
- number of active strains
- number of active pens
- number of active matings
- number of active experimental test plans
- number of active experimental tests
- number of mouse tests scheduled

To print the report use the normal Microsoft Access print function, i.e. File -> Print or equivalent.

Note: If mice in a pen have different owners, the pen will be counted more than once in the summary, once for each owner. Therefore, the total number of pens will agree with the sum of the number of pens each owner has.

13.1 What are Queries used for? – or How to Search the Database

One of the most important functions of JCMS is to provide methods of searching for answers to specific questions about the data. The best way to obtain copies of the data entered into JCMS is by using one of the special query forms to set up a **search**. All searches have two parts, the question (criteria) and a description of the data to return (result fields to show).

13.1.1 Basics on using the Query Forms

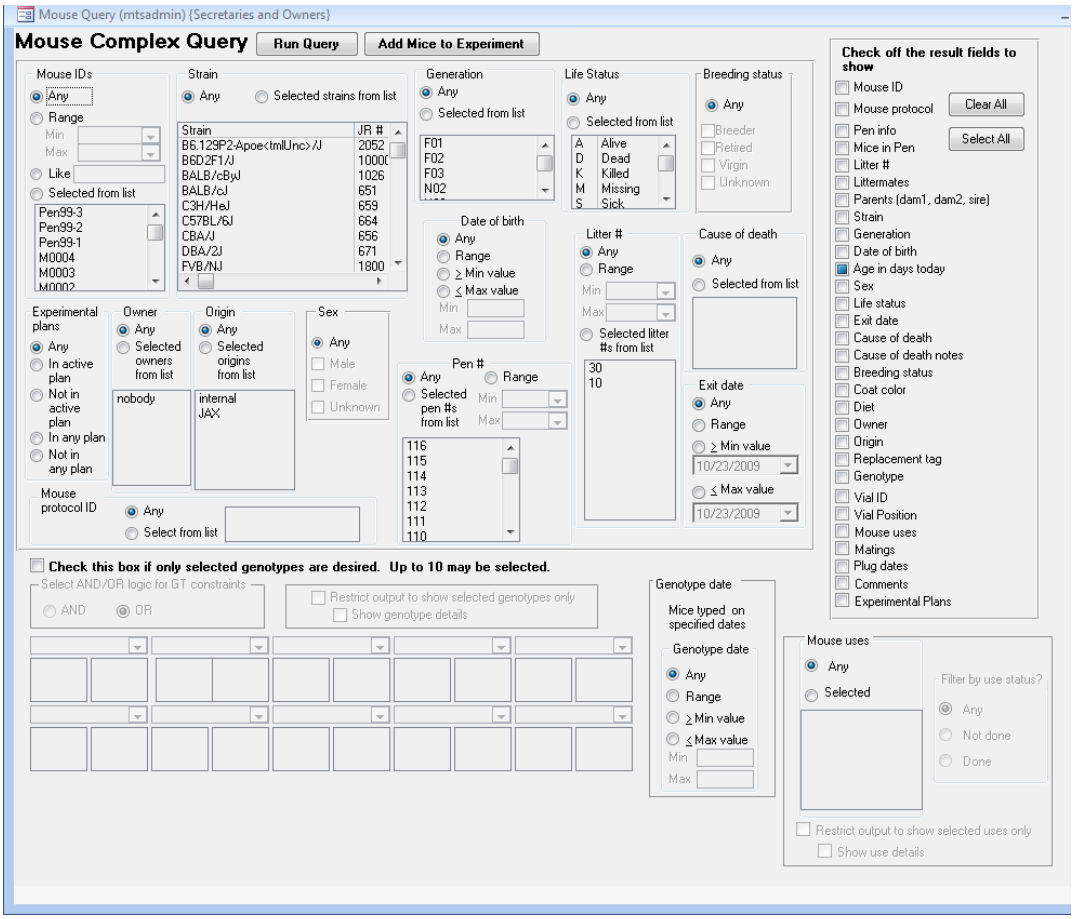


Figure 13-2 Form: Mouse Query

The above sample query form shows the general layout of the query forms. Each form provides many choices for the **criteria.** The criteria specify how to decide the data to return. A simple query is shown on the form above: show selected mice. The rest of the criteria possibilities are set to **Any**. These possible criteria are ignored. The second part of a query is to indicate what **result fields** to return. The query forms all have a set of check boxes on the right side listing choices of result fields.

Form1 : Form

Mouse ID	Strain	Generation	DOB	Mouse Uses	Genotype
1	ABC/xyzJ	N01	5/5/2005		
10	ABC/xyzJ	F01	5/5/2005	abc	cpdm[+-Y/+-Y]
11	ABC/xyzJ	F01	5/5/2005		
12	ABC/xyzJ	F01	5/5/2005		
16	ABC/xyzJ	N03	11/6/2005		
17	ABC/xyzJ	F02	11/6/2005		
18	ABC/xyzJ	F02	11/6/2005		
19	ABC/xyzJ	F02	11/6/2005		
2	ABC/xyzJ	N01	5/5/2005		
9	ABC/xyzJ	F01	5/5/2005	abc, abc, testing	cpdm[+-Y/+-Y], fsn[--Y/--Y]

Figure 13-3 Datasheet: Mouse Query Results

The Query forms allow extraction of information from JCMS into a datasheet form by clicking the **Run Query** button. This output of a query looks like a spreadsheet with a column for each result field, but it cannot be edited. The example above shows the results of the query shown in Figure 12-1. The datasheet can be easily **exported into Microsoft Excel** by selecting on the menu bar Tools – Office Links – Analyze it with Microsoft Office Excel.

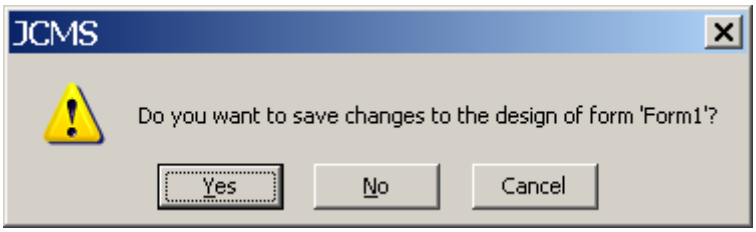


Figure 13-4 Query: Do you want to save changes to Form?

The contents of a query form in JCMS cannot be saved between sessions. To keep the information from a query, be sure to export it to Excel before leaving the JCMS session.

When the datasheet form is closed, a prompt appears with the option to save the query form that has been created. However, saving the form in JCMS will not preserve the query information between JCMS sessions. It is best to NEVER SAVE A QUERY FORM IN JCMS. Always answer **No** to this dialog box.

13.1.2 How to Select Query Criteria

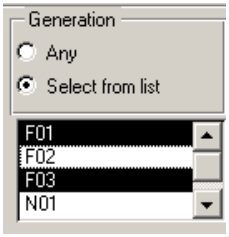


Figure 13-5 Query Form: List Box Criteria

For many of the criteria choices there is a list box and some push buttons. Push buttons allow specifying to select specific criteria items from the list box, or if you don't care about a particular criteria item, push the "any" button. Select individual items in the list box by holding down the control key (ctrl) on the keyboard and while holding down the key, use the mouse to select individual items by clicking on them. A range of items may be selected from the list box by holding down the shift key while using the mouse to select the first and last in the range. If the ctrl or shift key is not held down, selecting an item from the list box clears all other selections.

The example criteria is: show all mice with generation equal to F01 or F03.

Another push button option is "Range." Using this option allows specifying a minimum and maximum value or range of values for the query. Only mice between the minimum and maximum range, including the minimum and maximum values, will be included in the query results.

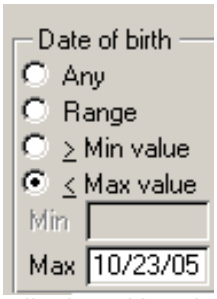
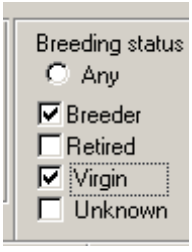


Figure 13-6 Query Form: Range Criteria

The example criteria is: show all mice with a date of birth less than or equal to 10/23/2005.



Another type of criteria choice provides multiple check boxes. If the any button is pushed, no check boxes are available (they are all gray and cannot be clicked on). Push the any button to make the check boxes white (available to choose). Multiple check boxes may be chosen or unselected by clicking on them with the mouse.

Figure 13-7 Query Form: Check Box Criteria

The example criteria is: show all mice that are breeders or virgins.

When more than one criterion is set to something other than any, the criteria are put together using “AND” Boolean logic. If the three examples above were used the criteria becomes: show all mice (with generation equal to F01 OR F03) AND (a date of birth less than or equal to 10/23/2005) AND (are breeders OR virgins).

Click the **Run Query** button to see the results. The Clear all and Select all buttons will only clear the choices of result fields. The criteria choices must all be cleared individually by clicking the any buttons. Output result fields must be specified for the query. If no fields are selected, an error message will be displayed.

13.1.3 Like criteria for Mouse ID.

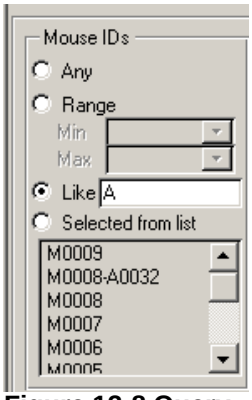


Figure 13-8 Query Form: Like Criteria

The Like criteria will return all mouse IDs that contain the string entered in the text box. In the example shown in the figure, only M0008-A0032 will be returned. Entering 00 would return all of the mouse IDs shown in the list.

JCMS has converted the string entered in the box to *A*. Otherwise the criteria of A would return only one mouse whose ID was exactly A. If a leading or ending * is entered by the user, no * will be added by JCMS. This allows entering *A to return all mouse IDs ending with A and A* to return all mouse IDs beginning with A. Standard wildcards as described below will work in the search. The information below is from Microsoft Access Help.

Built-in pattern matching provides a versatile tool for making string comparisons. The following table shows the wildcard characters you can use with the **Like** operator and the number of digits or strings they match.

Character(s) in *pattern*	**Matches in *expression***
? or _ (underscore)	Any single character
* or %	Zero or more characters
#	Any single digit (0— 9)
[*charlist*]	Any single character in *charlist*
[!*charlist*]	Any single character not in *charlist*

You can use a group of one or more characters (*charlist*) enclosed in brackets ([ ]) to match any single character in *expression,* and *charlist* can include almost any characters in the ANSI character set, including digits. You can use the special characters opening bracket ([ ), question mark (?), number sign (#), and asterisk (*) to match themselves directly only if enclosed in brackets. You cannot use the closing bracket ( ]) within a group to match itself, but you can use it outside a group as an individual character.

In addition to a simple list of characters enclosed in brackets, *charlist* can specify a range of characters by using a hyphen (-) to separate the upper and lower bounds of the range. For example, using [A-Z] in *pattern* results in a match if the corresponding character position in *expression* contains any of the uppercase letters in the range A through Z. You can include multiple ranges within the brackets without delimiting the ranges. For example, [a-zA-Z0-9] matches any alphanumeric character.

13.2 Mouse Query

The basics of using this query form are described above. Below is an explanation of how to use the genotype and mouse use portions of the mouse query form.

13.2.1 Query by Genotype (QGT)

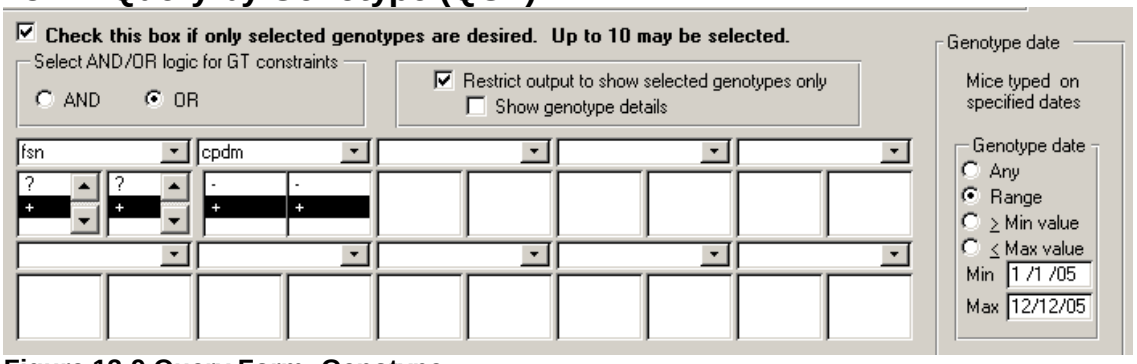


Figure 13-9 Query Form: Genotype

As part of the mouse query, it is possible to query for mice by genotype. That is, select only those mice with a particular set of genotypes (up to 10 may be specified). To use the QGT option, first select the check box near the bottom of the form that enables this feature.

It is important to understand that QGT constraints have two levels: the Gene level, and the allele level. For each Gene, it is possible (but not required) to select one or two alleles that must be matched in order for the query to return results.

There is a choice of using AND logic or OR logic (use the push button just above the QGT selection boxes to choose a logic type) when combining constraints at the Gene level. But at the allele level AND logic is always used.

For example, suppose there are three genes X, Y, and Z. And for each of these genes there are allele possibilities x1, x2, y1, y2, y3, and z1, z2 where the letter “x” associates with gene X etc.

Using OR logic you could select all mice with genotype X(x1,x2) OR Y(-,-). The “-“ means you don’t care what alleles are associated with the gene. This selection would return all mice that have the specific genotype of X(x1,x2) and all mice that have been genotyped for gene Y. There can be overlap in the sets since a mouse could have genotype X(x1,x2) and also Y(y3,y2).

Using AND logic you could select for mice with genotype X(x1,x2) AND Y(-,-). Only mice that have both the specific genotype X(x1,x2) and have also been genotyped for gene Y will be found.

Mice shown may also be restricted by the date they were genotyped. The genotype date selection criteria will further limit the mice that are found to only those mice genotyped on a specific date or date range.

13.2.2 Interpreting the Genotype output

Any mouse may have zero or more genotypes. Each genotype is reported in the following format:

labSymbol[allele1-conf/allele2-conf]

Example: bax[1-Y/0-N].

The allele confidence is reported as “Y” for “yes,” we have confidence or “N” for “no,” we do not have confidence.

13.2.3 Restricting genotypes in the query output

fsn	cpdm	More GTs
	cpdm[+-Y/+-Y] (pg=None) (sl=shelf 22) (dt=11/7/2005)	No More
	cpdm[+-Y/+-Y] (pg=None) (sl=shelf 22) (dt=11/7/2005	No More
	cpdm[+-Y/+-Y] (pg=None) (sl=shelf 22) (dt=11/7/2005	No More
fsn[--Y/--Y] (pg=None) (sl=shelf 55) (dt=11/7/2005)	cpdm[+-Y/+-Y] (pg=None) (sl=shelf 22) (dt=11/7/2005)	No More

Figure 13-10 Query Datasheet: Restricted Genotype Output

If you check the box for restricted genotype output, only the genotypes for the genes selected in the genotype constraints will be output. When this option is used, each genotype is reported in a separate column in the output form. You may also request genotype details and view the sample location and page number for the sample. Since a mouse may have been typed for more genes in than those selected, a column is added to the output form which indicates if there are "More" genotypes for this mouse, or "No More" genotypes for this mouse in the database.

Below is an example of a genotype with the genotype details; **pg** is page number, and **sl** is sample location. sl=NONE implies that there is no information about sample location in the database. Also **dt** is the genotype date field. In this case the date was not stored in JCMS so it is listed a no date.

Sod1[1-Y/1-Y] (pg=g7-84) (sl=NONE) (dt=no date)

13.2.4 Query by Mouse Use

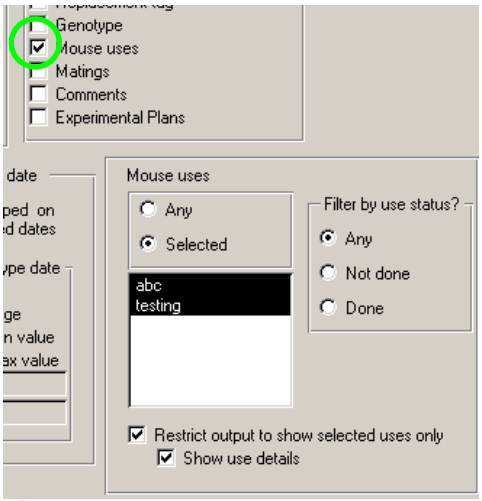


Figure 13-11 Query Form: Mouse Use

As part of the Mouse Query, it is possible to set up criteria for mouse uses. If multiple uses are selected the results will include all mice that have one of the selected uses (i.e. the uses are ORed together in the query). If the check box to restrict output to only the selected uses is checked, JCMS will put each selected use in a separate column (instead of putting all of the uses in one comma delimited list). Use details (such as comments) can also be shown this way. If a mouse has more uses than those displayed, the *more uses* column will be will have the word *more* in it. To be sure to see all uses for all mice selected in the query, the restricted output checkbox must be unchecked. Mouse uses must be checked in the results fields in order for the "restrict output to show selected uses only" check box to be enabled (see green circle). The "show use details" checkbox will not be enabled unless the "restrict output to show selected uses" box is checked.

The output can also be restricted to show only mice that have selected uses that are *not done* or *are done*. For example, this feature can be used to show all mice that have not yet been tested for a specific use.

Form1 : Form

Mous	MouseUse-abc	MouseUse-testing	More Uses
10	abc[UA-1 (not done) PD-6/4/2005](DATA: D1= 9 : D2= 9 : D3= 9 :)		No More
9	abc[UA-2.5 AD-7/22/2005 (done) PD-7/19/2005] (comments: D1 contains weight in gm	testing[UA-3 (not done) PD-8/3/2005] (comments: Special test p	No More

Figure 13-12 Query Datasheet: Mouse Uses

The use details use the following codes: UA for use age, PD for proposed date, comments, and DATA: D1=, D2=, etc for the data field values.

User note: use the use-report button on the main button bar to generate a report of all mice that are scheduled for use.

13.3 Mating Query

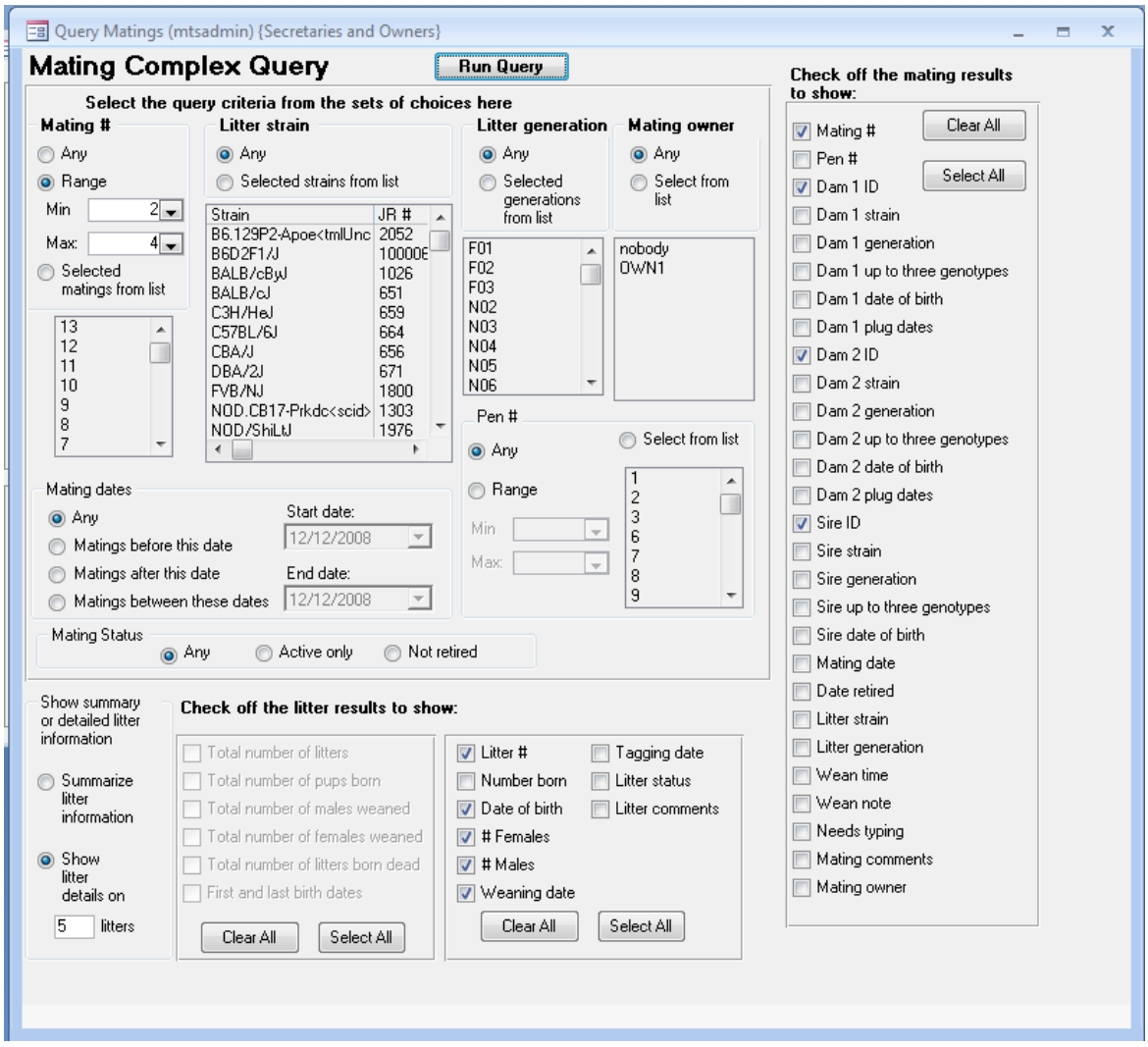


Figure 13-13 Form: Query Mating

The basics of using this query form are described above. In addition to the normal results field column on the right of the form, the mating query has a special results section at the bottom of the form for checking off the litter results to show. Choose either summary litter information or detailed litter information. WARNING, in the litter detail section it is possible to choose to view information on up to 12 litters. However, it is important to understand that if all fields are selected for 12 litters of detail information, the output form will have over 100 columns on it. This can get unwieldy very quickly and it might overload the system resources. If it is necessary to view a high number of litters, then be sure to select only one or two fields for output in the litter detail section.

Form1 : Form

matingID	Dam 1 ID	Dam 2 ID	Sire ID	Mating Date	litter ID1	DOB1	# Female1	# Male1	Wean Date1	litter ID2	DOB2
4	12	10	6	11/6/2005	41	11/6/2005	3	3	11/24/2005		
5	9	8	6	9/29/2005	51	11/6/2005			12:00:00 AM		
6	1		4	11/6/2005	61	11/6/2005			12:00:00 AM		
7	18	19	22	9/29/2005							

Figure 13-14 Query Datasheet: Mating

13.4 Experimental Plan Query

The basics of using this query form are described above.

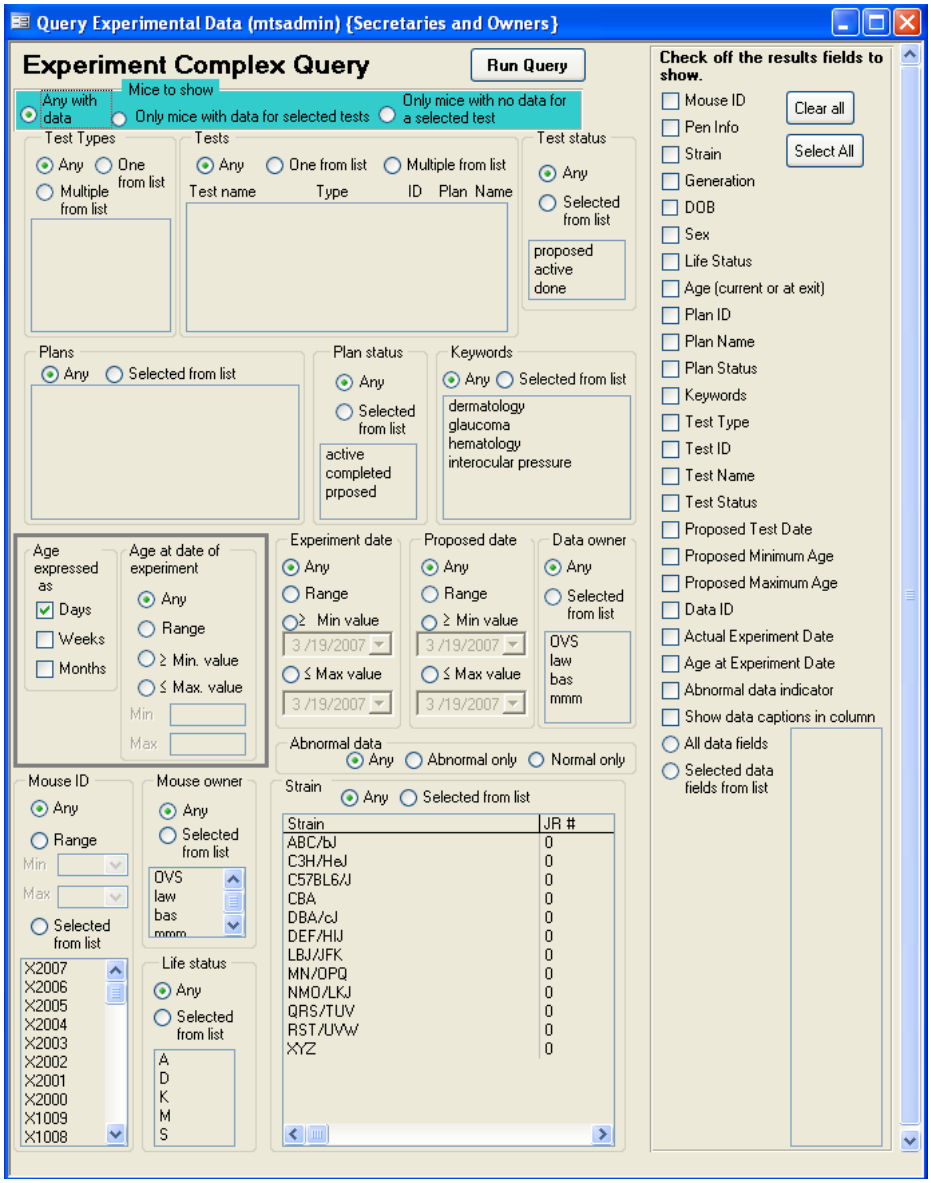


Figure 13-15 Form: Query Experiment

This form offers four basic choices when selecting the criteria:

1. Any with data: results will be returned for all mice that have experimental data records associated with them. This can result in a mixture of results that include data from experimental plans and data records that are not part of experimental plans depending on the criteria.
2. Only mice with data for selected tests: The results will only include mice that have experimental data records AND are part of some experimental test. The rest of the criteria should specify the experimental test(s) and other choices. The possible choices have been limited to eliminate those that would cause a conflict (for example: an experimental test is always part of only one plan, therefore it is not possible to choose a plan name as this plan

might not include the test that was chosen, a situation that would yield no results). If Tests is left set to “any” then other criteria such as a range of mouse IDs or test status may be specified. This will yield all mice with data records that fit the criteria AND which are part of some experimental test.

3. Only mice with no data for a selected test: This will give results for all mice that have been pre-selected for the experimental test, but have NO DATA RECORD for that test. No criteria except the one test may be specified. The output result field choices will be limited to eliminate the data record fields.

When only one test type is specified in the criteria, it is possible to choose from the data caption list instead of the generic D1, D2, D3, and etc. list. The rest of the time, the results may have different types of values in the D1, D2, D3, and etc. list. Check “show data captions in column” so the caption will appear in the results.

13.5 Microsoft Query

Microsoft Query (MS Query) may be used to select data from an "outside source" such as JCMS and bring it into MS Excel. In this case, Excel must be set up to ask for data from a Microsoft Access database named JCMS.mdb. See the Microsoft documentation for information on using MS Query.

14 Experimental Plans

JCMS provides a method for defining experiments conducted using the mice within the database, setting up definitions for the various experimental tests, data, and data defaults, and recording experimental results. It can also be used to setup, track, and schedule mice for use in the experiments.

The following tables are used:

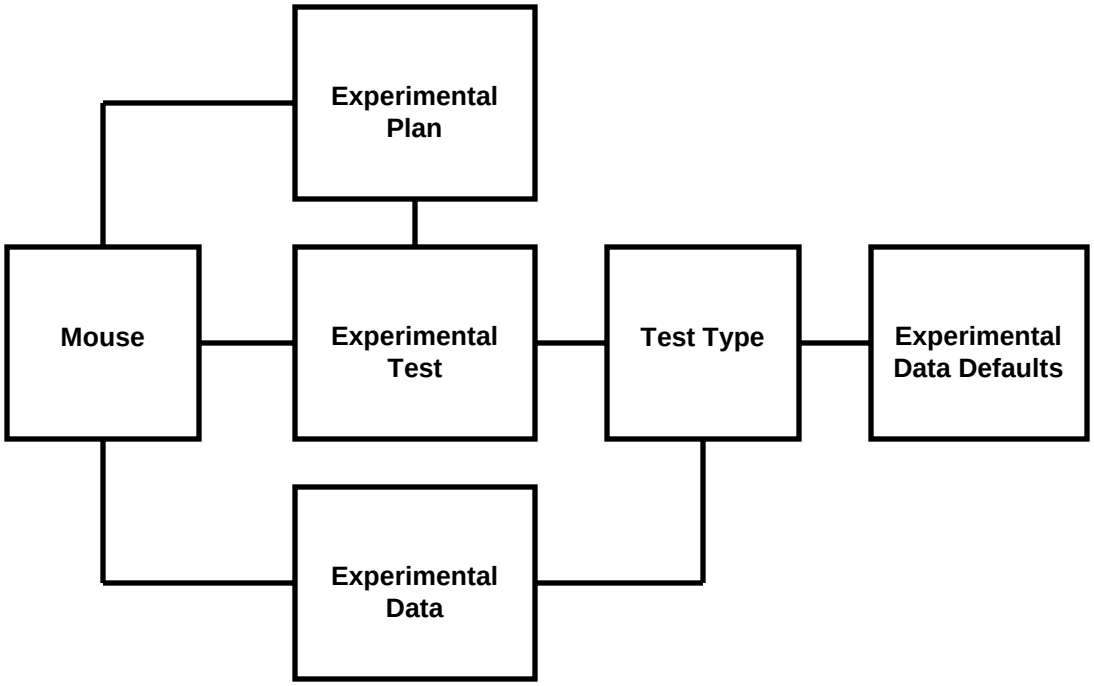


Figure 14-1 Diagram: Experimental Plan Tables

Experimental Data: One experimental data record consists of a set of data results for a mouse. A mouse may have many experimental data records, each one for a different test. Each experimental data record has to have an associated test type record that defines the format of the data results. Usually, each data record is associated with a test within a plan. However, it is possible to create data records that are not associated with a plan/test.

Experimental Plan: A definition of one experiment or project, referred to as the plan. The plan is used to coordinate the tests, mice planned for use in a test, and results. Each plan may have many mice scheduled to be part of it. Conversely, a mouse may be scheduled into many plans.

Experimental Test: One plan usually consists of several different tests (procedures). Some tests will be repeated multiple times perhaps using different sets of mice or with changes in protocol. JCMS considers each repetition a separate experimental test. Each test may have many mice scheduled to be part of it. Conversely, a mouse may be scheduled into many tests. A test must have one plan associated with it and one test type. The test type defines the format of the data results for this test. A test may have many experimental data records (results) associated with it, one for each mouse scheduled for the test.

Experimental Test Type: To make the repetition of tests easier, JCMS allows the user to define each type of test used. This test type and data description includes a specific definition of the data collected. Up to 30 different result fields may be collected per mouse as part of one test.

Each result field may have specified a meaningful caption, maximum value, minimum value, format (date, numeric, text), and whether or not it is required.

Experimental Data Defaults: Sets of default values for particular test types may optionally be defined to help with data entry of the experimental data results. Data defaults are associated with only one test type.

Experimental data may be recorded without an association to a plan and test. However, all experimental data must be associated with an experimental test type in order to define the data result fields.

An experimental plan may have mice pre-selected for it for planning purposes. An experimental test may also have pre-selected for it a subset of the mice selected for the plan. One mouse may be selected for multiple tests within a plan and may also be selected for other plans.

14.1 How to use an Experimental Plan

Error! Objects cannot be created from editing field codes.
Figure 14-2 Diagram: Experimental Plan
The experimental plan flow shown above is what the user will normally work with. The plan and tests will be defined. Mice will be scheduled for the various tests. Experimental data is collected and entered for the mice. Finally, reports and spreadsheets are output based on the mice and data collected.

Behind the scenes, some things have to be defined to set up the flow above. Each step is defined in detail below. The general plan definition and execution process includes:

- Define the **test types** that will be used for the tests in the plan. Once a test type is created it may be used over and over again within this and other plans. The test type defines the data results fields to be collected.
- Define the **data default** values for the test type. These values are sets of expected or standard results for some or all of the data result fields. They are used to help with data entry. These may be created at any time during the life of a plan. There may be several choices of data defaults created for a test type.
- Create the **experimental plan**.
- Create **experimental tests** for this experimental plan using the pre-defined test types. Each experimental test includes information about the proposed date, projected number of mice and ages of the mice. A specific test type may be used repetitively for different groups of mice, different dates, and/or different ages. Each repetition must have its own experimental test created for it.
- **Schedule** mice into the plan and various tests. Scheduling mice is optional, if mice are not pre-scheduled, they will be automatically entered into the plan and test when the data is entered.
- Print the **experiment work report.** This report is used to list what tests are scheduled for a particular time period.
- Enter the **experimental data** results.
- Use the **experiment query** to export results into MS Excel, determine mice that have not had the data results entered yet, and answer any other questions about the status of experimental plans, tests, or data.

14.2 How to Create Experimental Data without using an Experimental Plan

It is possible to enter experimental data for mice into JCMS without going through the process of creating experimental plans and tests or scheduling mice. This process includes:

- Define the **test types** that will be used for the data results. Once a test type is created it may be used over and over again. The test type defines the data results fields to be collected.

Pre-defined test types for a plan may also be used to create experimental data records outside of a plan. However, it is not possible to use data default values without having an experimental test record.

- Enter the **experimental data** results.
- Use the **experiment query** to export data results into MS Excel and answer questions about the experimental data.

14.3 Setting up Test Types (Data Descriptions)

The test type and data description must be created before experimental tests or experimental data results can be added to an experimental plan. Even if an experimental plan is not used, the test type must be created before experimental data results may be entered. Once the test type is created, it may be reused for this or other experiments and data results.

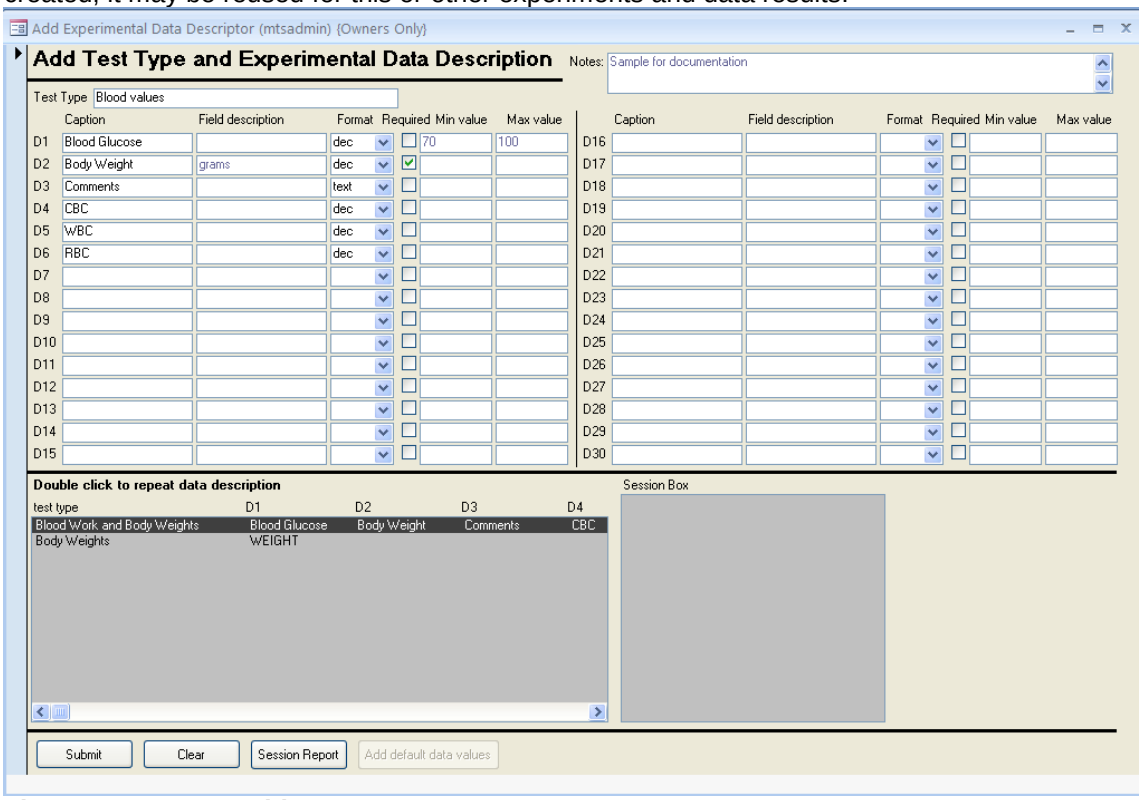


Figure 14-3 Form: Add Test Type

Click the **Add Test Type – Data Description** button to open the form. This form may also be opened by clicking a button on the Add an experimental test form. Only owners or an Administrator may create test types.

Use a brief but meaningful name for the test type, up to 32 characters long. This name must be unique (not used by any other test type). Use the notes field to enter a description of the test, protocols, etc. The description may be as long as needed. Up to 30 data result fields may be defined. These are labeled D1, D2, D3, etc. on the form. The results will later be entered into an experimental data record using this description to validate them. For each data result field, enter the following:

- Caption: Used on the forms as the “name” of the data to enter. Use a short but meaningful caption, up to 16 characters long.
- Field description: An optional short description of the result field. The description might indicate the units such as cm, gm, etc. or the expected text entries such as yes/no or mutant/control. It may be up to 16 characters long.
- Format: Select text, date, integer, or decimal value. The format will be used during experimental data entry to check for errors. For example, when the data results are entered, if a numeric format is chosen no text or special characters will be allowed except for the normal ones associated with numbers (-, +.)
- Required: Indicates if the field is required or not during data entry. By default, fields are not required.

- Min value: Optional field. When experimental data is entered, numeric data may not be less than this minimum value.
- Max value: Optional field. When experimental data is entered, numeric data may not be greater than this maximum value.

A list box at the bottom of the form shows test types that have already been defined. If the test type to add is similar to an existing one, double click it in the list box. The values for that test type will be repeated on the form. These can then be changed and submitted for the new test type.

After successfully submitting a new test type, click the "Add default data values" button to set up any defaults that would help with experimental data entry.

14.4 Editing a Test Type

Click the **Edit Test Type** button to open the form. This form looks and works in the same manner as the Add test type form. New data result fields may be added to an existing test type and changes to fields may be made only if no experimental data or test type defaults exist for this test type. A test type may be deleted only if there is no experimental data in the database for this test type, no experimental tests that are using this test type, and no default data records for it.

14.5 Setting up Default Data for Experiments

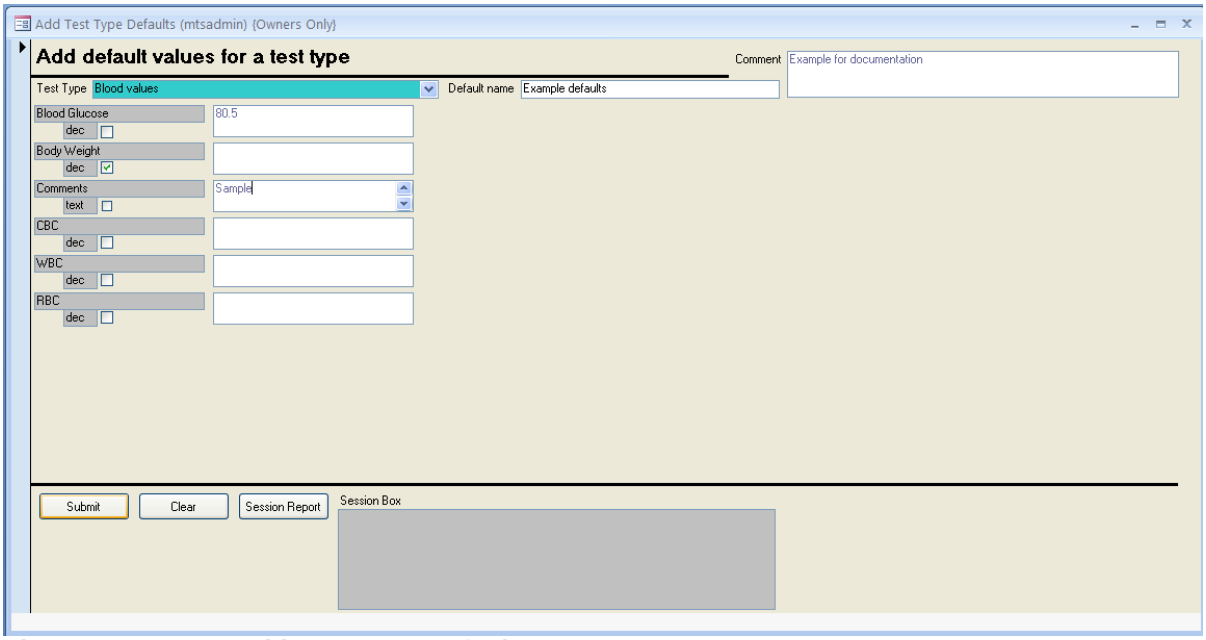


Figure 14-4 Form: Add Test Type Defaults

Click the **Add Test Type Defaults** button to open the form. The Test Type defines the different data fields used for an experimental test. The test type data default values define a set of standard results that might be expected. Several data default records can be created for one test type, each will contain one set of possible default results. There does not need to be a default value for each data value field. One of these sets of standard results (data defaults) can be selected at the creation of an experimental test. These defaults are then used when experimental data is entered to speed up the data entry process. The values that are specified have to fit within any minimum, maximum, or format that is defined for the data field. No data field is required to have a default value.

When experimental data is entered, the data defaults are displayed on the data entry form, where they may be edited to change any values that differ from the defaults.

Only the plan owner or the Administrator may create the data defaults.

14.6 Editing Default Data

Click the **Edit Test Type Defaults** button to open the form. Only the Administrator may edit or delete a test type data default record. Any edit changes made to a data default will not automatically change any experimental test that is already using this data default. That experimental test will still contain the old defaults. To change these in an existing experimental test, edit that experimental test and select the defaults again from the list of possible data defaults.

14.7 Adding an Experimental Plan

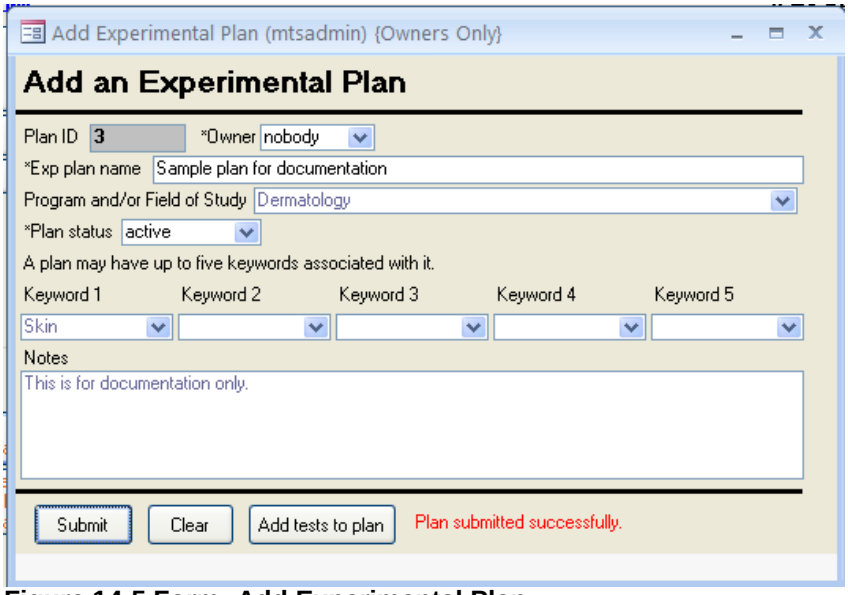


Figure 14-5 Form: Add Experimental Plan

Click the **Add Exp Plan** button on the main button bar to open the form. The plan ID number will be assigned by JCMS. All experimental plans must have an owner. All experimental data generated for this plan will be assigned this same owner. All plans must be given a name and status. The program and/or field of study and keyword fields are provided so the user may later query for plans using this information. The Administrator sets up the choices for these fields.

14.8 Adding an Experimental Test

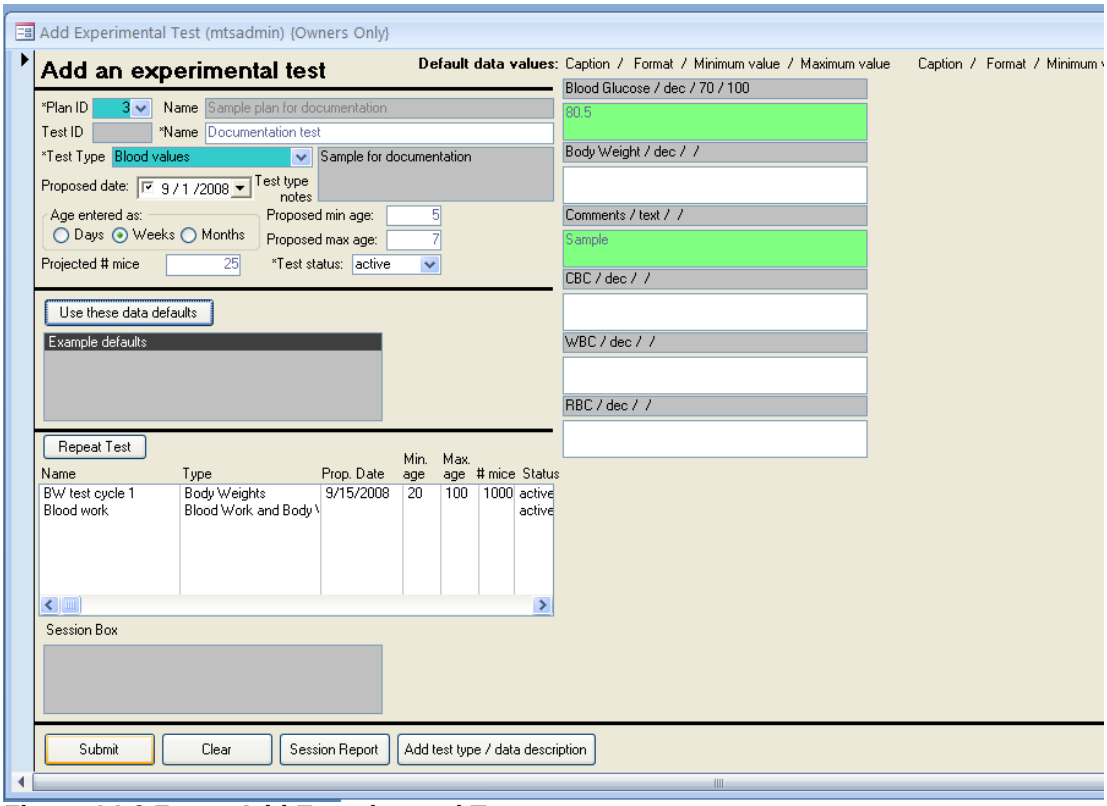


Figure 14-6 Form: Add Experimental Test

Click the **Add Exp Test** button to open the form. This form may also be opened from the Add an experimental plan form or Manage an experimental plan form. Only owners and the Administrator may add experimental tests.

An experimental test is always associated with only one experimental plan. Start by **selecting the plan**.

In order to re-use existing tests (even from other plans), you can select a test from the white list box on the lower left hand side of the form and click **Repeat Test**.

Then enter a unique test name of up to 32 characters. JCMS will assign a test ID. Choose the test type. JCMS will then display the captions for the data value fields and any choices for data defaults.

Several fields are used to track the progress of the experiment including the current test status, a proposed date for the test, projected number of mice to use, and a suggested minimum and maximum age for the mice. This proposed age range may be entered in days, weeks (7 days/week), or months (30.4375 days/ month).

The caption, format, min and max values used to define the data results to be collected for this test type are displayed on the form. To help with data entry, default values for these data result fields may be entered. These default values may be chosen from a list of previously created data defaults: select the default name and click the “Use these data defaults” button on the form. Changes may then be made to the default data values to customize them for this test.

14.9 Editing an Experimental Test

Click the **Edit Exp Test** button to open the edit an experimental test form. Only owners and the Administrator may edit experimental tests. This form looks and works in the same manner as the Add experimental test form. Select the experimental test by its name and ID number. The experimental plan the test is associated with may not be changed. The test type may not be changed once experimental data exists for this test. The delete button to remove a test from an experimental plan will only function if there is no experimental data for this test and no mice have been selected for the test.

14.10 Selecting Mice for an Experimental Plan

Three different methods may be used to select mice for experimental plans and tests.

1) The simplest method is to add the mice to the plan when the data is added. This method does not allow scheduling to be used.
2) Add the mice using the Mouse Query form. This method takes advantage of the query form criteria for selecting possible mice for the plan. A second step in the process uses the Bulk add mice from query form to add only a subset of the mice in the query result set.
3) The Manage an experimental plan form is used to remove mice from a plan and to move pre-selected mice into and out of experimental tests that are part of the plan.

14.11 Adding Mice to a Plan using the Mouse Complex Query Form

Mice may be **pre-selected** for use in experimental plans and tests. The **Query Mouse** form is used to add mice to experimental plans and tests. Click the **Query Mouse** button to open the form and use it as described in the Basics on using the query forms section to select a set of mice. No results fields need to be chosen. Click the "**Add mice to Experiment**" button. The **Bulk add mice from Query** form will open. It will show the mice selected by the query in the "mice in query results list" on the left side of the form.

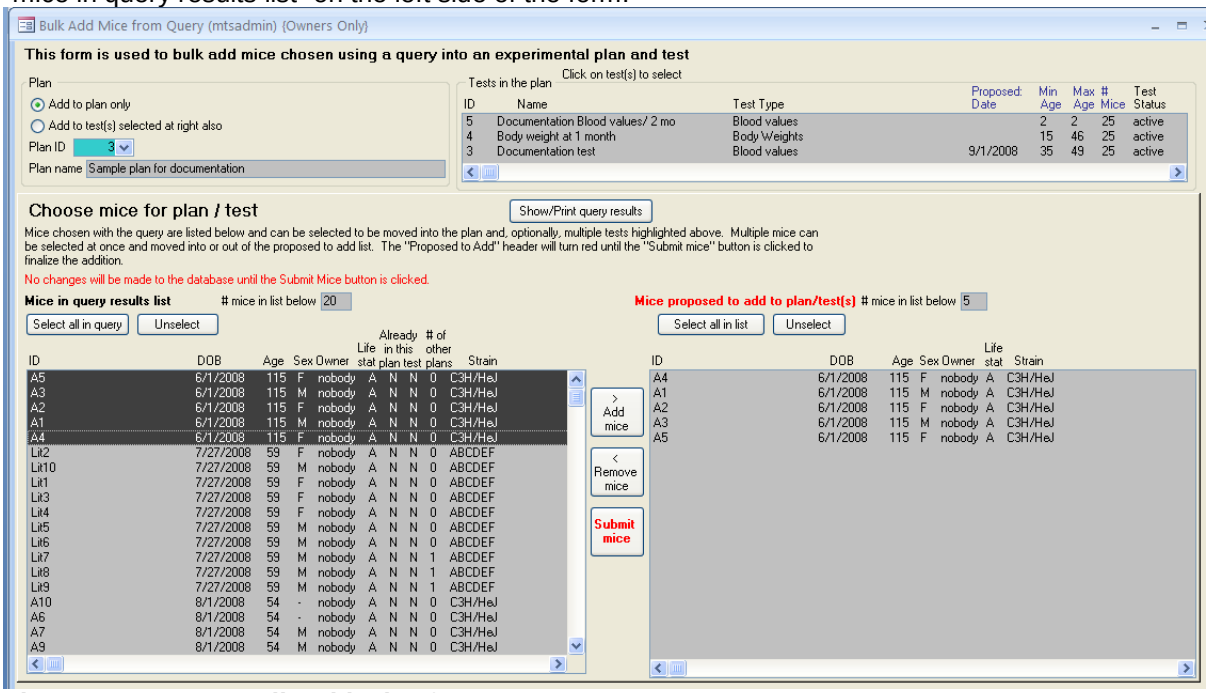


Figure 14-7 Form: Bulk Add Mice from Query

Choose the plan to add the mice to. Any experimental tests that are part of this plan will now be listed in the "Tests in the plan" box at the top right of the form. It is also possible to add the mice to one or more of the tests in this plan by selecting the tests in this box. Be sure to **click** the **"add to test(s) selected at right also"** push button if adding mice to tests. Otherwise, the mice will not be added to the selected tests, only to the plan. Note that a mouse cannot be added to a test unless it is also added to the plan. Mice may be added to a plan that does not have any tests. It will not be possible to add experimental data records for these mice until a test describing that data has been added to the plan. This may be done later.

Select mice to be added and click the **"> add mice"** button to move them into the list at the right. Mice may be removed from the "mice proposed to add" list box by selecting them and clicking the **"< Remove mice"** button.

The mice in the query results list box will indicate with a Y/N if each mouse is already in (pre-selected for) the selected plan and selected test. The number of other plans the mouse is pre-selected for will also be displayed. If more than one test is selected, the Y/N will be only for the first (or top) test in the list as shown in the tests in this plan list box.

The **"Show/print query results"** button will show a print preview giving the contents of the Mice in query results list.

Once the list of mice proposed to add is ready, click the **"Submit mice"** button to make the changes to the database. A print preview of the submit report will appear on the screen. This

report will indicate what actions were taken. It lists each mouse ID, the owner, and then a set of codes indicating if the mouse was added or not. The header will list the plan ID and any selected test IDs. The codes will appear in the order given in the header. The code “A” indicates the mouse was added to the plan or test and the code “E” indicates the mouse already existed in the database (previously pre-selected) for that plan or test. An additional code “C” will appear at the end of the listing if the mouse has an owner different from the owner of the plan. This is a reminder to check with the owner of the mouse before using it.

Example of the report format:
Plan owner = ABC, Plan = 6, Test(s) = 12, 15

MOUSE ID, OWNER, PLAN, TEST(S)

123, ABC, A, A, A
456, ABC, E, A, E
789, XYZ, E, A, A, C
123, ABC, E, E, E

The above sample of a printout indicates that mouse 123 (owned by ABC) was added to plan 6 and tests 12 and 15. Mouse 456 was already selected for plan 6 and test 15. It was not already selected for test 12, so it was added to that test only. Mouse 789 was already selected for plan 6. It was not pre-selected for either test, so it was added to both. The code “C” is a reminder to check with owner XYZ for permission to use this mouse. Mouse 123 already existed for both the tests and plan (note it was accidentally repeated in the list of mice to add). No more action was taken for that mouse.

Error message: “XX mice were selected by the query, more than can be held in the Query Results box**. The list has been shortened to show only xx mice**. Use these or close the form and re-do the query.” It is possible to select a very large number of mice with the Mouse complex query form. The bulk add mice from query form arbitrarily selects only about 50 of these mice for use with the form. Otherwise, the dataset can become awkward to deal with. If the mice displayed are not those desired, close the form and change the query criteria.

Bulk Add Mice from Query - Submit report for mtsadmin (11/18/2005 3:42:13 PM)
Plan Owner = OVS, Plan = 1, Test(s) = 1
A=Added; E=already existed; C=Check wowner for permission to use
MOUSE ID, OWNER, PLAN, TEST(S)

63, OVS, A, A
64, OVS, A, A
65, OVS, A, A
66, OVS, A, A
67, OVS, A, A
68, OVS, A, A
69, OVS, A, A
70, OVS, A, A
71, OVS, A, A
72, OVS, A, A

Printed 11/18/2005 3:45:36 PM

Another sample report

Figure 14-8 Report: Add Mice to Plan

14.12 Managing an Experimental Plan

Click the **Manage/Edit Exp Plan button** to open the form. It is used to move mice in and out of tests and for deletion of mice from tests and plans. This form is also used for editing the experimental plan fields and deletion of tests from a plan. **Mice are considered “in” a test and/or plan** if they have been pre-selected for it or if they have an experimental data record

containing the results for the test. Mice do not have to be pre-selected; they will be automatically added to the plan/test when the data results are entered.

14.12.1 Choosing Mice for Experimental Tests

The Manage/edit Experiment Plan form is used for moving mice pre-selected for a plan into and out of experimental tests associated with that plan.

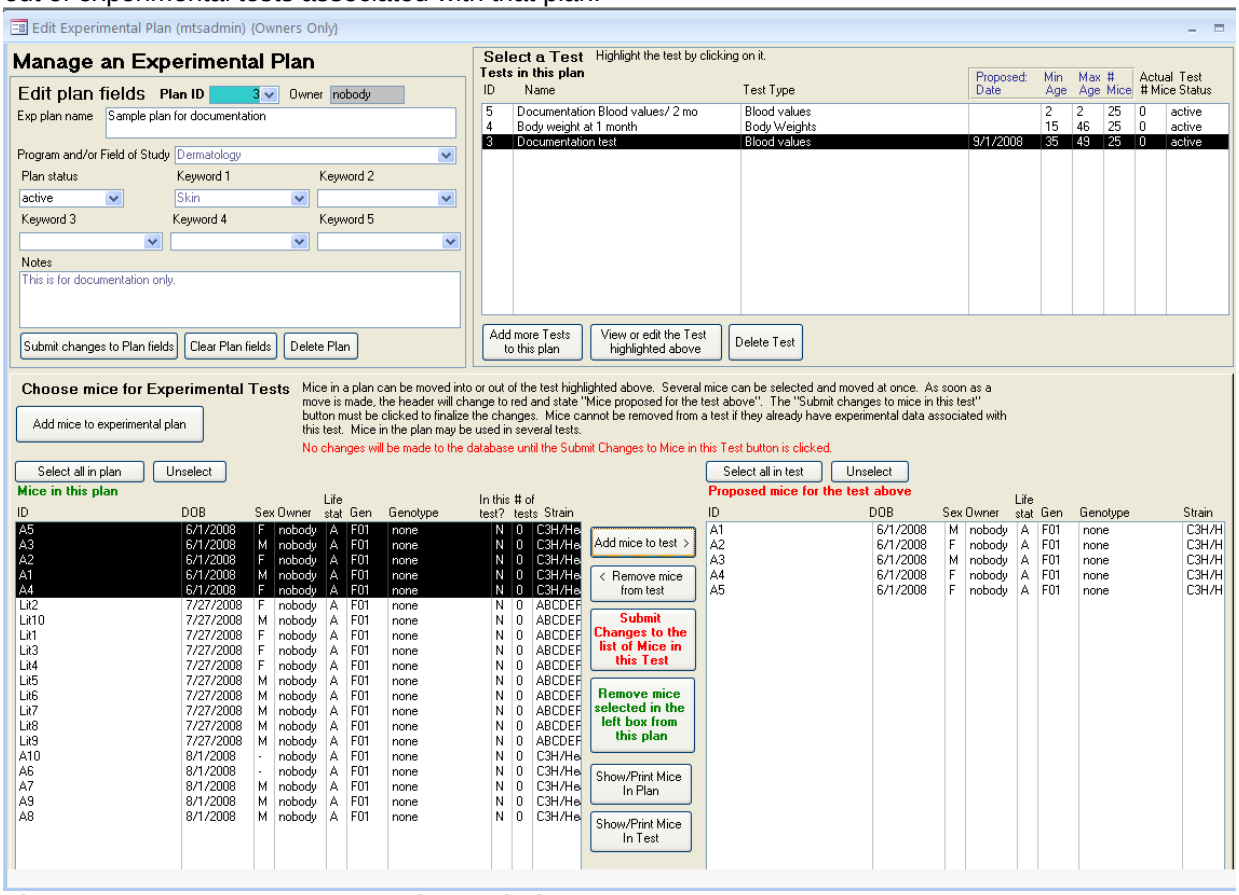


Figure 14-9 Form: Manage Experimental Plan

First **choose the plan ID**. Then **select one experimental test** by clicking on it in the "Tests in this plan" list box (upper right of the form). All mice in the plan will be listed in the bottom left box and all mice currently in this test will be listed in the bottom right box. Select mice and move them back and forth between the boxes with the **"Add mice to test >"** and **"< Remove mice from test"** buttons. Multiple mice may be chosen by holding down the Control (Ctrl) key while clicking on each mouse. The "Select all" and "Unselect" buttons may be used to pick all the mice at once or to remove the selection from all the mice.

No changes will be made to the database until the **"Submit changes to the list of mice in this test"** button is clicked. A report is displayed on the screen showing the changes that were made to the database. If no mice are listed, then all mice in the "Proposed mice for the test above" list box (right side) were already in the test. Otherwise, one of the following actions will be listed for each mouse: **D** (mouse was removed from those pre-selected for the test); **A** (mouse was added to those pre-selected for the test); or **X** (mouse was not removed because it already has an experimental data record for this test).

The **"Show/print mice in test"** button will display a report listing all mice in the test and the current action that has been specified for each mouse. This action may be: **A** for add this mouse, **R** for remove this mouse, or **N** for no action.

Edit/Manage Exp. Plans: Submit results for changes made to mice in a plan/test. Report for mtsadmin (11/18/2005 3:58:49 PM)

Listing of changes to mice for Plan ID 1 and Test ID 3

ID, DOB, Sex, Owner, Life Status, Gen, Genotype, Strain, Action taken (D=removed, A=added, X=not removed, mouse has exp. data), Warnings

---

63, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

64, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

65, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

66, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

67, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

68, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

69, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

70, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

71, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

72, 10/20/2005, M, OVS, A, N01, none, XYZ/xJ, A

Printed 11/18/2005 4:00:47 PM

Figure 14-10 Report: Edit/Mange Experimental Plan

14.12.2 Removing Mice from an Experimental Plan

The Manage/edit Experiment Plan form is used to remove mice from the list of those pre-selected for an experimental plan.

First **choose the plan ID**. Select the mice to be removed from the plan in the **"Mice in this plan"** list box (left side). Multiple mice may be chosen by holding down the Control (Ctrl) key while clicking on each mouse. The "Select all" and "Unselect" buttons may be used to pick all the mice at once or to remove the selection from all the mice. Click the **"Remove mice selected in the left box"** button. A report is generated showing the changes that were made for each mouse selected. "Y" indicates the mouse was removed from those pre-selected for the plan. "**Unable to delete from plan**" indicates that the mouse is also pre-selected for an experimental test or has experimental data records for one or more tests. Mice that have data may not be removed from the plan. Mice that are only pre-selected for an experimental test must be removed first from the test. Then the mouse may be removed from the plan.

The **"Show/print mice in plan"** button will display a report listing all mice in the plan with a Y/N indicating if each mouse may be deleted or not. This report also indicates if the mouse is in the currently selected test and how many tests in this plan that each mouse is in.

14.12.3 Editing Experimental Plan Fields

The Manage/edit Experiment Plan form is used for changing the fields describing the experimental plan. These are the fields shown in the upper left section of the form. Select the Plan ID. The "**Clear Plan fields**" button will blank all fields including the required ones. The "**Submit changes to Plan fields**" button must be clicked to make the changes permanent in the database. The owner and plan ID may not be changed. The plan name and status are required.

14.12.4 Deleting an Experimental Plan

The Manage/edit Experiment Plan form is used for deleting experimental plans. Select the plan ID. Click the "**Delete Plan**" button. A plan cannot be deleted if it has any experimental tests, any pre-selected mice, or any experimental data records associated with it.

14.12.5 Deleting an Experimental Test

The Manage/edit Experiment Plan form is used for deleting experimental tests. Select the test from the list box at the upper right side of the form. The delete test button will only function if there is no experimental data for this test and no mice have been pre-selected for the test.

14.13 Adding or Editing Experimental Data for a Mouse

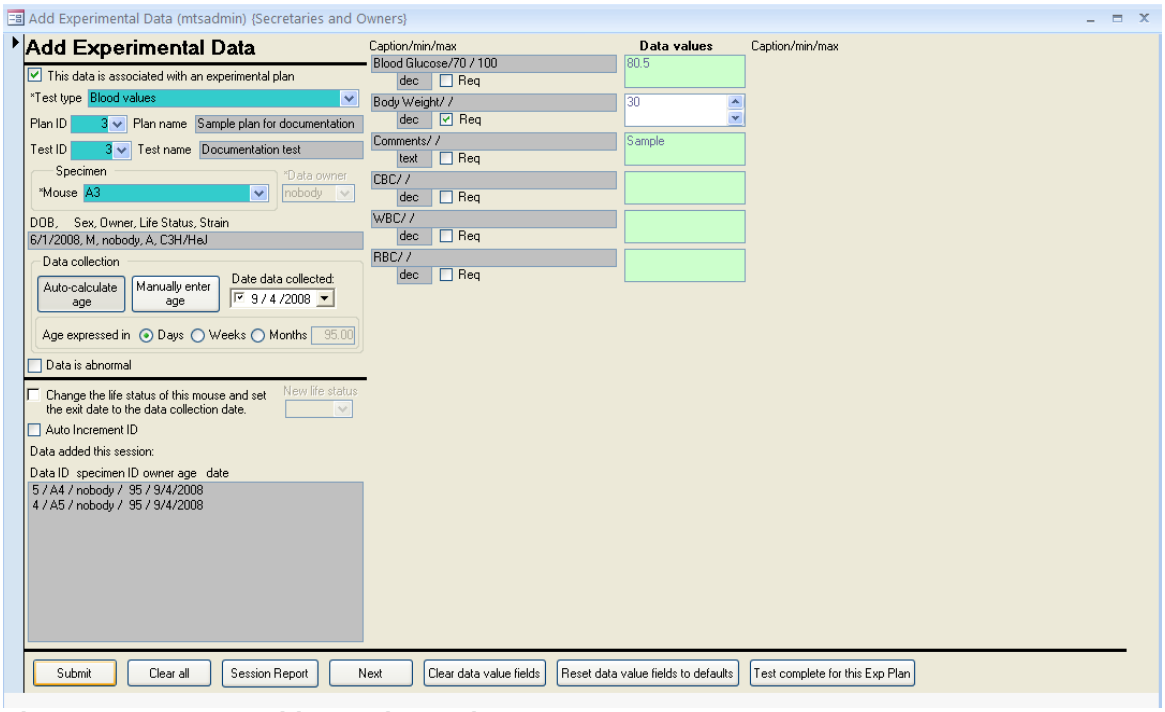


Figure 14-11 Form: Add Experimental Data

Click the **Add Exp Data** button from the main button bar to open the form. Experimental data does not have to be associated with an experimental plan and test. To add data for mice not in a plan, remove the check mark next to "**This data is associated with an experimental plan**". The unnecessary fields will now be grayed out and all mice will be listed in the mouse drop down box.

Begin adding experimental data by choosing the **test type**. The captions for the data values will then appear on the form. Any minimum or maximum values will be displayed and the required box will be checked if the field must have data entered. Choosing the test type will narrow down the choices of experimental plans and tests to only those for this test type.

Choose the **Plan ID** to narrow down the choices of experimental tests. Then choose the **Test ID**. The test ID may be chosen without first picking the plan ID. Once the test is chosen, any default data values that have been set up for it will be displayed. These are to aid in data entry and should be changed to the actual value for each specimen.

Once the test ID is chosen, only mice that need to have a data record added will be listed in the **mouse** drop down box. These are mice that are pre-selected for this test. See the section on managing an experimental plan to learn how to pre-select mice.

To enter data for a mouse that is not pre-selected for a test, type the mouse ID into the mouse drop down box. A confirmation box will appear to verify that the mouse should be added to the list of pre-selected mice for this test. If YES is selected, the mouse will be added to the list of those pre-selected **even if the data record is not later successfully submitted**. The mouse is added to the pre-selection list first, before the experimental data submit occurs. See the section on managing an experimental plan to learn how to remove mice from those pre-selected for a test.

JCMS always sets the owner of the data to be the same as the owner of the plan. If no experimental plan and test is used, then the owner of the data may be set to any valid owner.

The age field indicates the **age of the specimen at the time of data collection**. JCMS will calculate this from the data collection date and birth date of the mouse if the **Auto-calculate age** button is selected. A warning message will appear if the mouse's life status is not "alive" and the experiment date is after the mouse's exit date. JCMS will store the age field value as number of days old. Age may be entered in weeks or months by selecting the appropriate radio button.

If one or more data values in the test results for this specimen are abnormal, then check the Data is abnormal box. Later, this value may be used to easily locate all experimental data records with unusual results.

If the "**Change the life status of this mouse and set the exit date to the data collection date**" box is checked, then the mouse record will be updated at the same time as the experimental data record is submitted. The mouse will not be updated unless the submit is successful for the experimental data record.

If "**Auto Increment ID**" is checked, then the next pre-selected mouse ID (alphabetically) will be displayed in the mouse drop down box.

The **Data ID** for this experimental data record is assigned by JCMS and will be displayed in the "Data added this session" box.

The **Test complete for this Exp Plan** button will change the test status in the experimental test record for the test currently indicated in the Test ID box to "done".

14.14 Editing Experimental Data

Click the **Edit Exp Data** button to open the form. Select either **Data ID** or **Mouse** as the method to use for selecting the experimental data record to edit.

Selecting a **Plan ID** or **Test ID** will limit the choices in the other drop down boxes. If the desired drop down boxes are grayed out (not available to choose from), then click the Data ID or Mouse buttons again. This will start the selection process over. When no test ID is selected, a particular mouse may be listed multiple times in the mouse drop down box, once for each experimental test the mouse has data results for.

The Data ID and Mouse drop down boxes will show all experimental data records that exist for the selected test ID. These boxes will not show pre-selected mice that have no experimental data record yet. Use the Add experimental data form to add the data for the pre-selected mice.

The rest of the fields on the form work the same as on the Add experimental data form described above.

14.15 Adding Experimental Data to Several Mice at Once

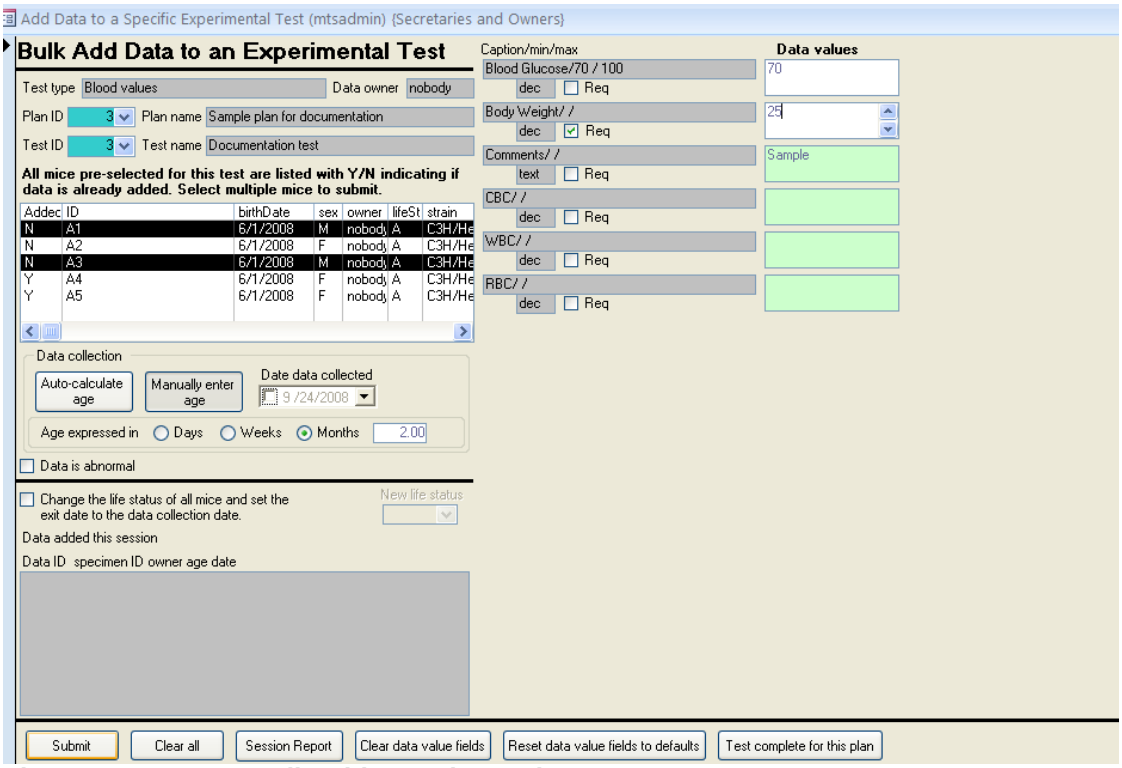


Figure 14-12 Form: Bulk Add Experimental Data

Click the **Bulk Add Data to Specific Test** button to open the form. This form is used to enter new data values for mice that have already been selected as part of a particular plan and test. If several mice should have all the same data values, this form may be used to speed up data entry. Or, it could be used to create data records for a group of mice where many of the data values are the same, then use the Edit Experimental Data form to change or add specific values for each individual mouse.

Select the experimental **plan ID** to limit the choices in the test ID box to only those for the specific plan.

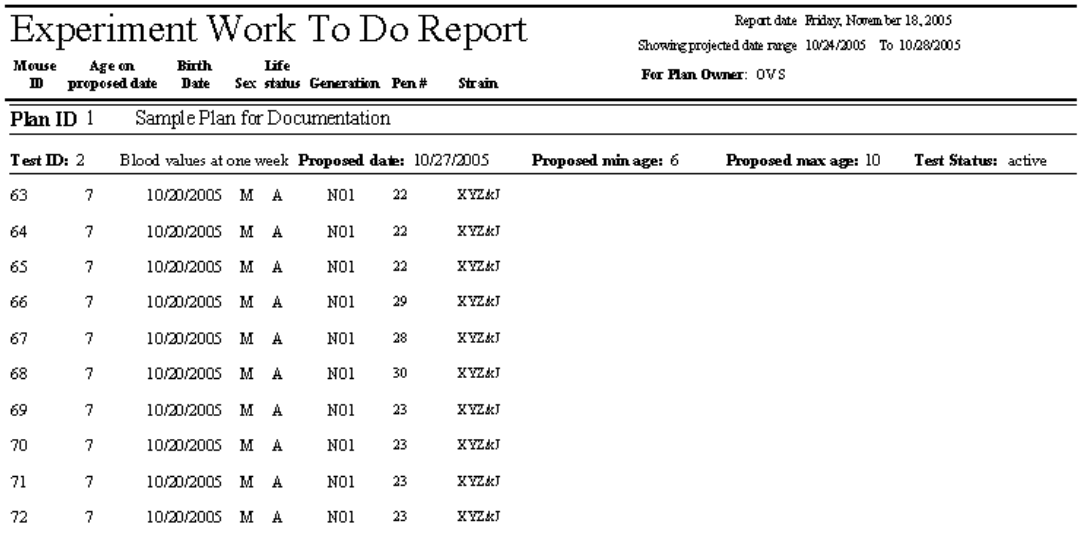
Once a **test ID** is chosen, the list box will show all mice that have been pre-selected for the test. The first column indicates if a data record has already been added (Y) or not (N) for that mouse ID.

Select one or more mice in the list box. WARNING: The whole batch will be rejected if any of the selected mice already have a data record (Added = Y).

The rest of the form works similarly to the Add Experimental Data form described above.

14.16 Experiment Work Report for Scheduling Procedures

Click the **Print Experiment Work Report** button to open a form for requesting the report. This report is designed to provide lists of mice for a work “to-do” schedule. It will give a listing by test of all the pre-selected mice, where the proposed test date is within a selected date range. This report may only be printed for one owner at a time. Basic information about the mice will be printed (ID, pen, strain, generation, date of birth, age at the beginning date of the range, sex, life status, plan ID, test ID, test proposed date.) The report will display in a print preview format first in order to save paper.



Experiment Work To Do Report

Report date Friday, November 18, 2005
Showing projected date range 10/24/2005 To 10/28/2005
For Plan Owner: OVS

Mouse ID	Age on proposed date	Birth Date	Sex	Life status	Generation	Pen #	Strain
Plan ID 1	Sample Plan for Documentation						
Test ID: 2	Blood values at one week	**Proposed date:** 10/27/2005		**Proposed min age:** 6		**Proposed max age:** 10	**Test Status:** active
63	7	10/20/2005	M	A	N01	22	XYZ&J
64	7	10/20/2005	M	A	N01	22	XYZ&J
65	7	10/20/2005	M	A	N01	22	XYZ&J
66	7	10/20/2005	M	A	N01	29	XYZ&J
67	7	10/20/2005	M	A	N01	28	XYZ&J
68	7	10/20/2005	M	A	N01	30	XYZ&J
69	7	10/20/2005	M	A	N01	23	XYZ&J
70	7	10/20/2005	M	A	N01	23	XYZ&J
71	7	10/20/2005	M	A	N01	23	XYZ&J
72	7	10/20/2005	M	A	N01	23	XYZ&J

Figure 14-13 Report: Experiment Work To Do

14.17 Experimental Plan Query

This query is described in the Queries section under Experimental Plan Query.

14.18 Importing Experimental Data

The Import Experimental Data function of JCMS loads data from files and automatically populates the *experimental data* records for the mice identified in the file. The data may be associated with *experimental tests* that are part of an *experimental plan* or just be associated with mice.

Many research programs use machines to generate data, such as blood work. It is impractical to try to support individual file formats for the many different machines that already exist and new ones being built each year. Therefore, imported data must be in a specific file format known as CSV (comma separated values). Many applications, such as MS Excel, are capable of creating a file using this standard format. Some user-manipulation of the file may be required prior to importing it.

The data format must match a user-created and defined JCMS *experimental data definition (test type)*. This test type may be set up to closely match the output file from a machine or application. The JCMS identifier (*mouse ID*) is used to match the data to the mice.

Process Diagram

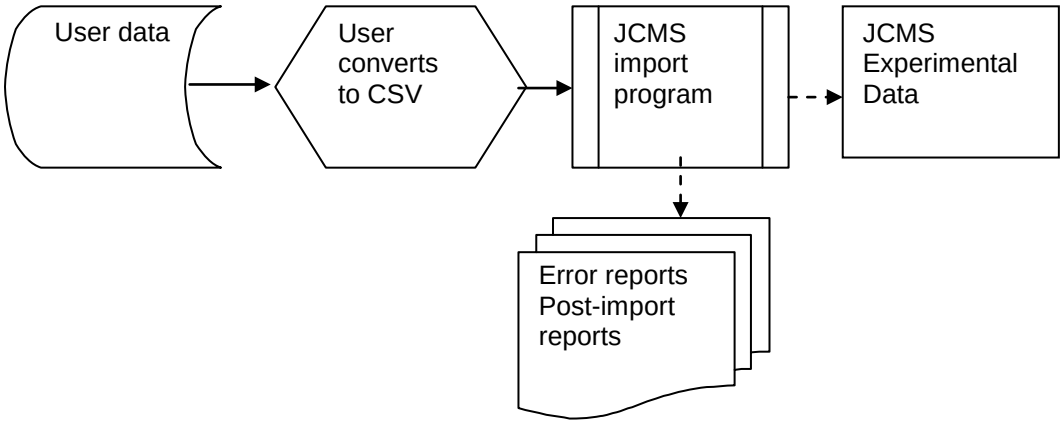


Figure 14-14 Process for importing experimental data from a user file

14.18.1 Input file format

A file using the CSV (comma separated values) format consists of multiple lines or rows with the data values separated with commas. If the file is created using MS Excel, then each line is the same as a row in a spreadsheet. Each data value consists of the contents of one cell in a column. MS Excel will insert the comma used to separate the data values when the file is saved. These commas are not visible in the cells. CAUTION NOTE: data values, such as comments, cannot contain comma characters because commas are used as data value separators.

JCMS format requirements

Token row: The input file may contain rows that are ignored at the beginning. It must start with a row containing "JCMS_DATA". This is a token used by the import program to determine where to start processing the file.

Header row: The header row must be the next row following the JCMS_DATA token. The header row contains the captions indicating what data value is in each column.

- There are three special captions: Mouse ID, Abnormal Data Flag, and Data Collection Date. The first two are required and the Data Collection Date is optional.
- All data values that are imported must be in a column with a caption that matches one defined in the JCMS *Test Type*.
- Columns that do not match a *Test Type* caption or the three special captions are ignored.
- If the *Test Type* has required data, a column for that data must be present.
- The columns may be in any order.
- Duplicate captions are not allowed and will generate an error message.

Example of an input file

Blood, body weight test
Tested on 1/2/08
Chuck Donnelly

JCMS_DATA

Mouse ID,	**Abnormal Data Flag,**	**Data Collection Date,**	**Blood Glucose,**	**Body Weight,**	**Comments**
CJD-002,	T,	,	0,	45.0,	found dead
CJD-003,	F,	1/2/08,	89.2,	34	
CJD-010,	F,	1/3/08,	76.95,	30	
CJD-005,	T,	1/2/08,	,	36.4,	malfunction

Data rows: All rows after the header are assumed to contain data.

- Data collection date is an optional field and may be left blank. If all the data has the same collection date, then the date may be entered once on the import form instead of being present in the input file.
- Blank rows within the file and at the end are ignored.

14.18.2 Create a test type

This is an example of the Add test type form showing creation of a test type that matches the input file header above.

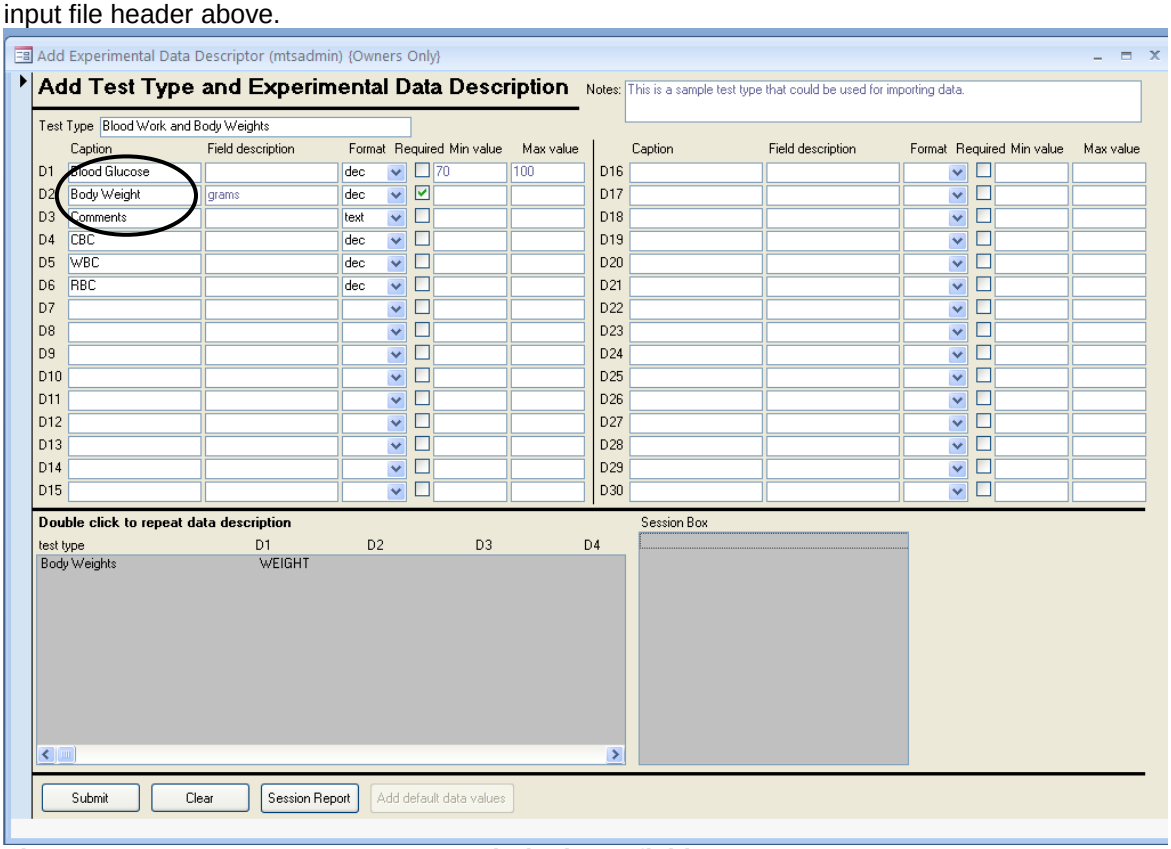


Figure 14-15 Create a test type to match the input fields

Note there can be captions in the test type that are not used in the importation process.

14.18.3 User Interface

The Import Exp Data button on the main button bar is used to initiate the import process.

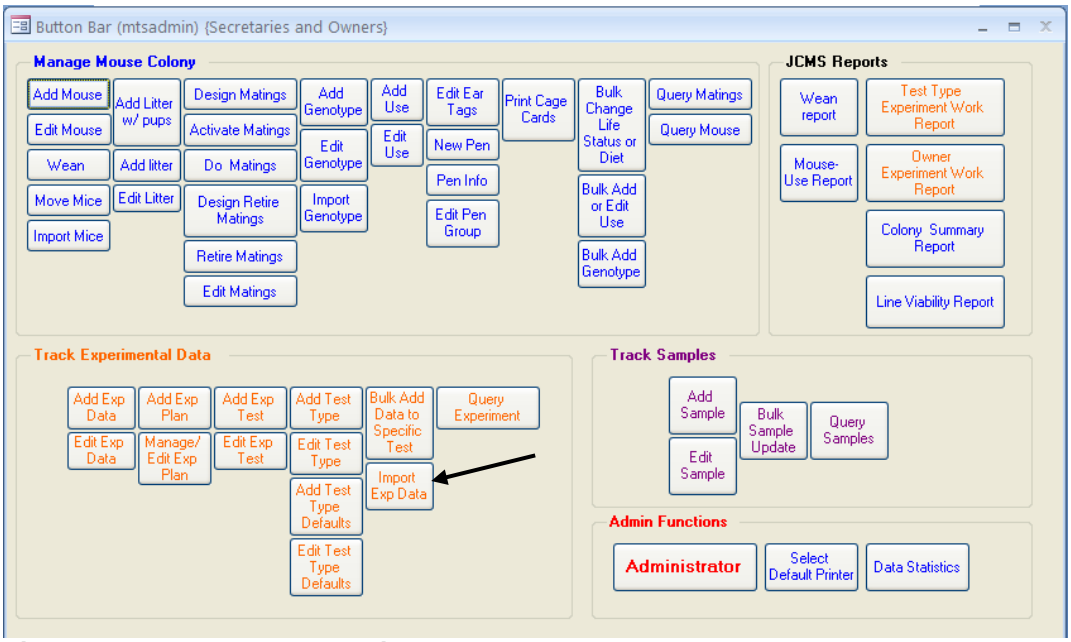


Figure 14-16 Import Exp Data button

Filling in the Import Experimental Data form.

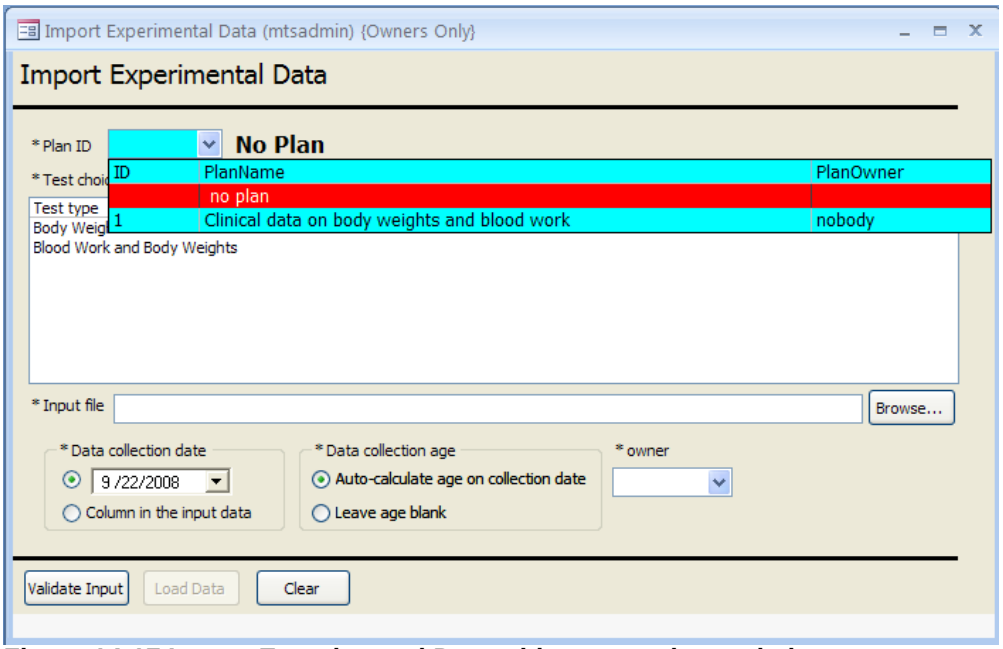


Figure 14-17 Import Experimental Data with no experimental plan

To add experimental data to mice without using an experimental plan, select “no plan” from the choices in the Plan ID combo box.

Select the test type from the list of choices. Browse to find and select the input file. The data collection date may be entered with the same value for all the data records by selecting it using the calendar. Otherwise, use the radio button to indicate it is present in a column in the input data file. The data collection age is an optional field. It may be auto-calculated (by using the mouse's birth date and the data collection date) or left blank. When an experimental plan is not used, the owner of the data must be specified. This may be different from the owner of the mice.

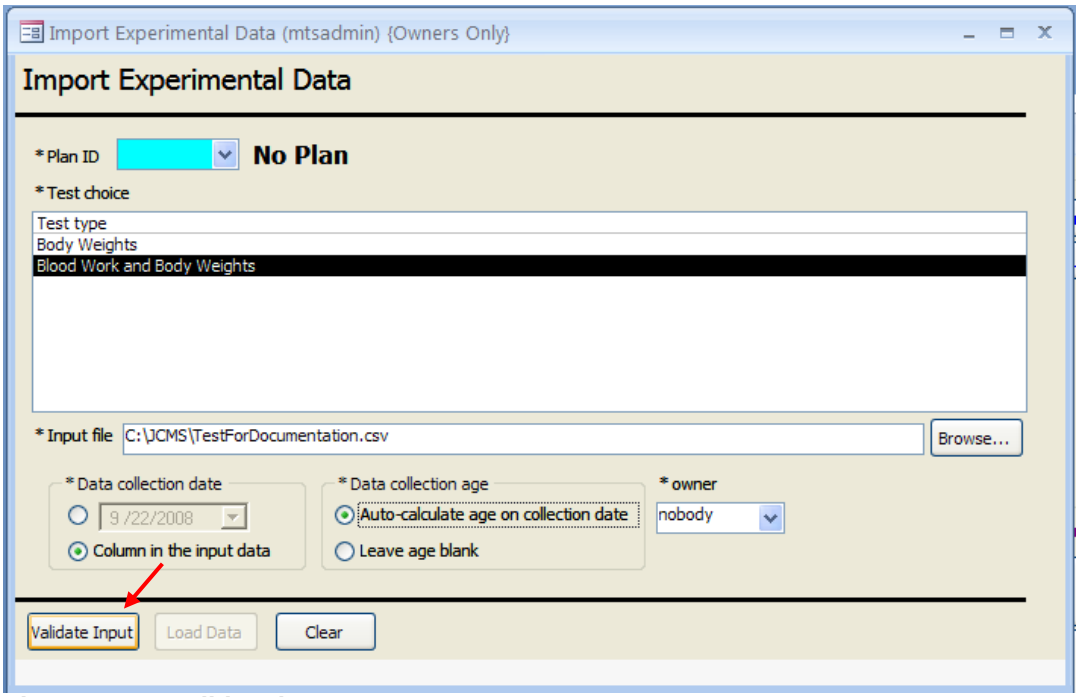


Figure 14-18 Validate input

Use the Validate Input button to initiate the validation process. The data file will be checked to determine if there are any problems and a report will be displayed indicating if the data may be imported.

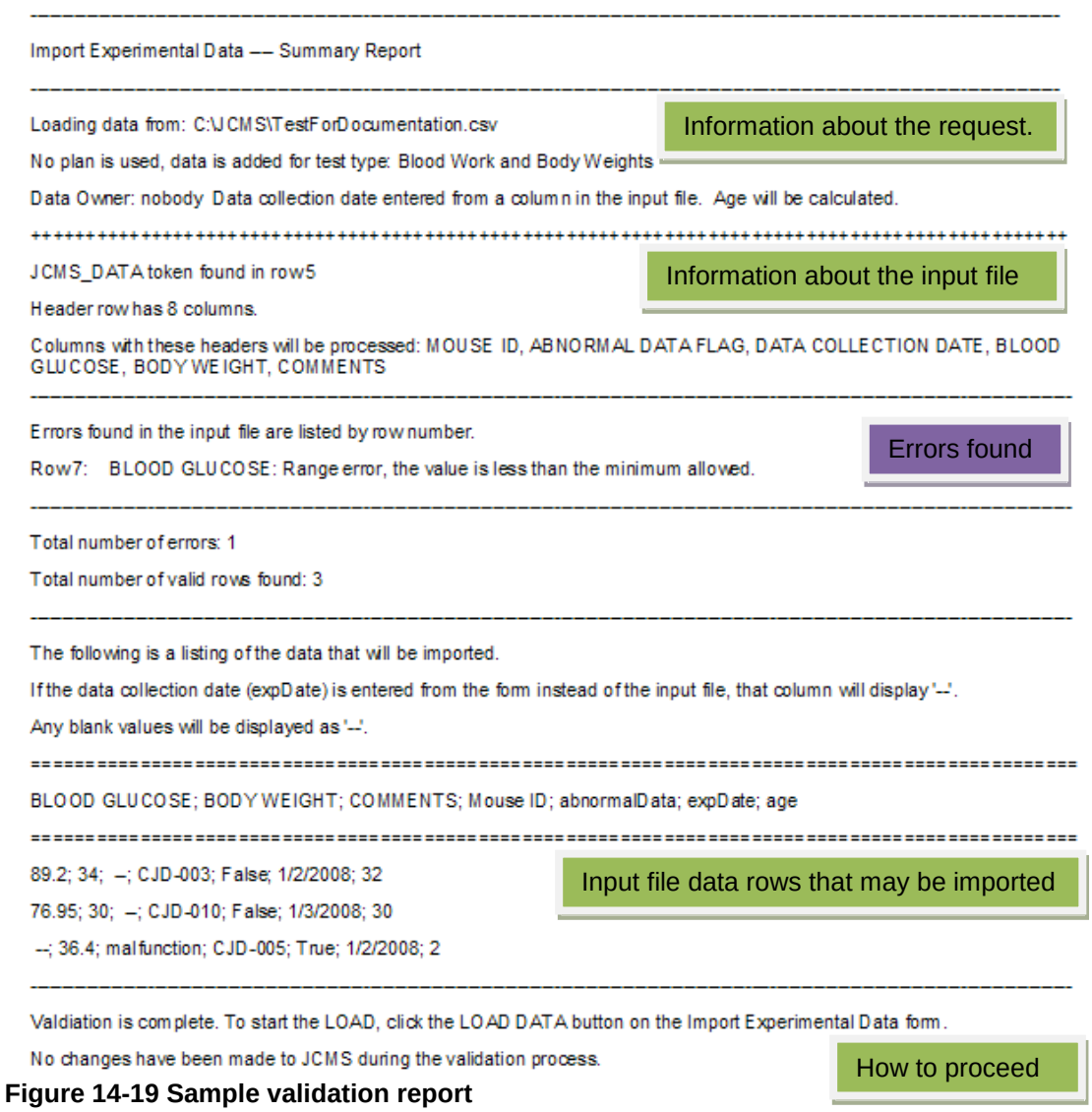


Figure 14-19 Sample validation report

In the case above, one input file row has been rejected with an error. The rest of the input file may be imported or the input file can be corrected and the validation run again.

The number of errors that are acceptable is determined from a setup variable called JCMS_MAX_IMPORT_EXP_DATA_ERRORS. Once the error limit is reached validation will stop and errors must be corrected in the input file. The default is 10 errors.

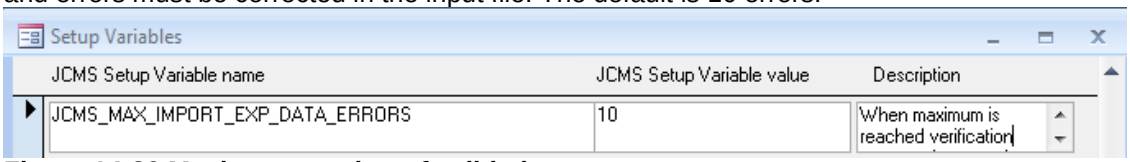


Figure 14-20 Maximum number of validation errors

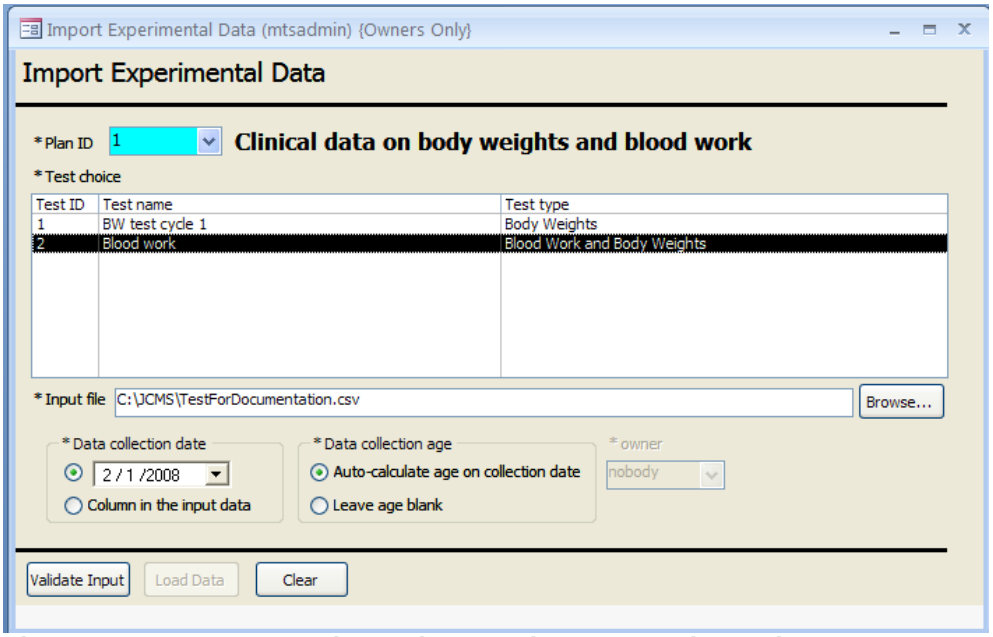


Figure 14-21 Import Experimental Data using an Experimental Test

To record experimental data that is associated with a particular experimental test, first choose the experimental plan ID. The list of choices will change to show all active tests for that experimental plan. The owner is automatically set to be the experimental plan owner. Browse to select the input file. Select the experimental test and data collection date and age settings. Click the Validate Input button.

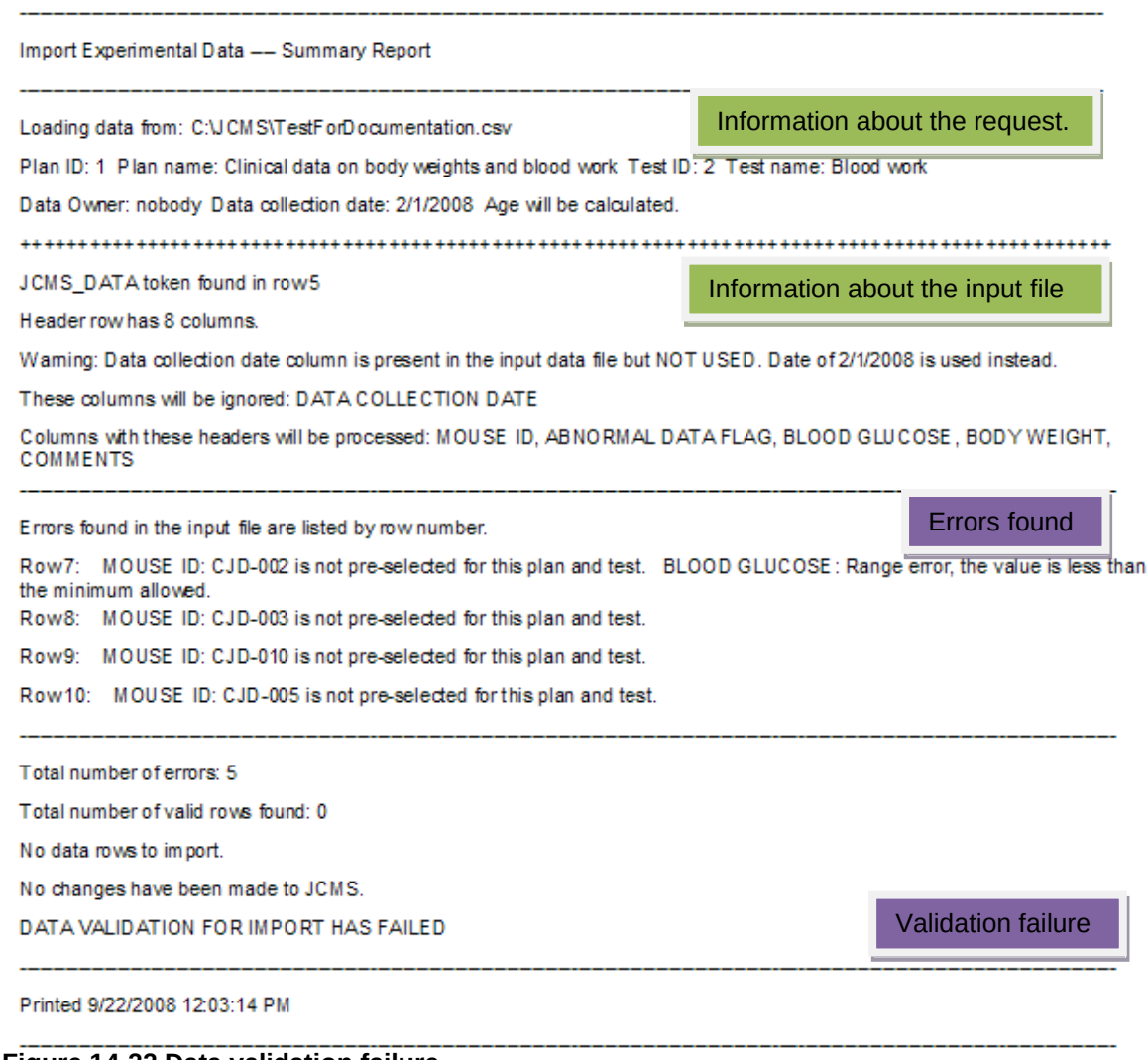


Figure 14-22 Data validation failure

In the case above, no rows have passed the validation step and the input file or other parameters must be changed. The mouse IDs need to be added to this test using the Manage Exp Plan form or the setup variable shown below must be changed to “false”, allowing the mice to be added to the experimental test at the same time as the data is imported.

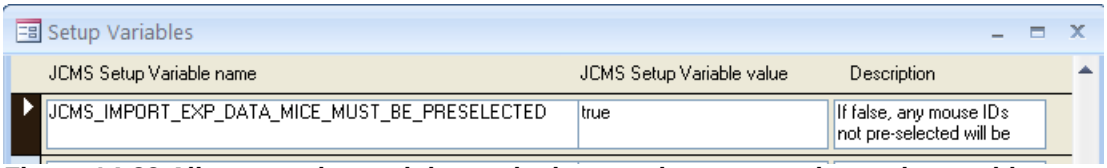


Figure 14-23 Allow experimental data to be imported to an experimental test without preselecting the mice

When some of or the entire input file has passed the validation step, the Load Data button will be enabled. Click it to proceed. The load report will be displayed listing the rows added and those rejected with errors.

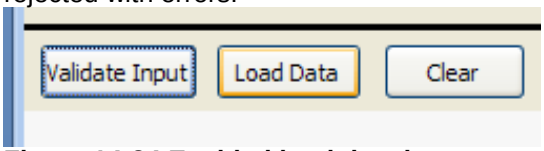


Figure 14-24 Enabled load data button

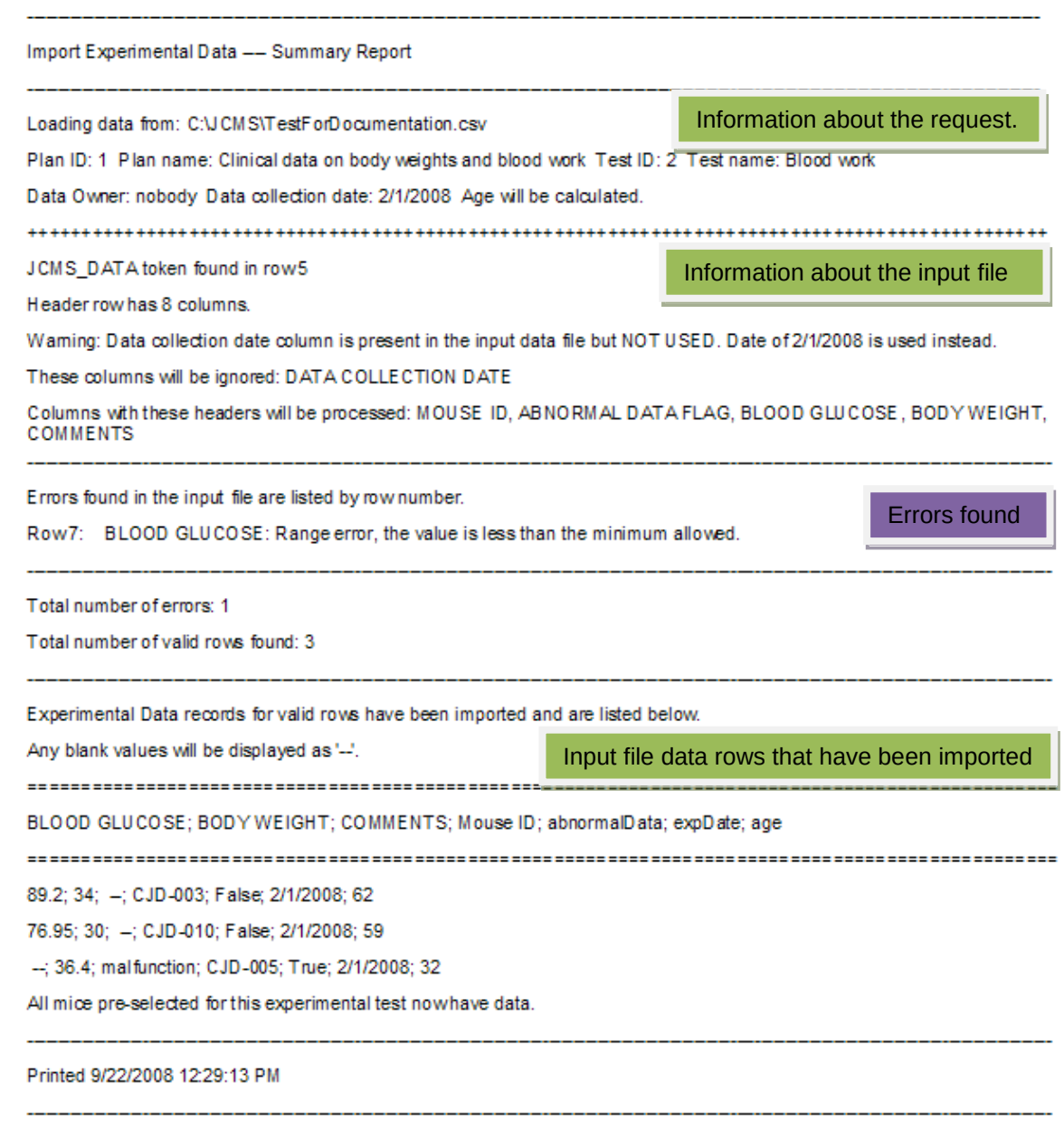


Figure 14-25 Final load report

When a load to an experimental test is completed, if all the preselected mice have a data record, the option to change the experimental test status from “active” to “done” is offered.

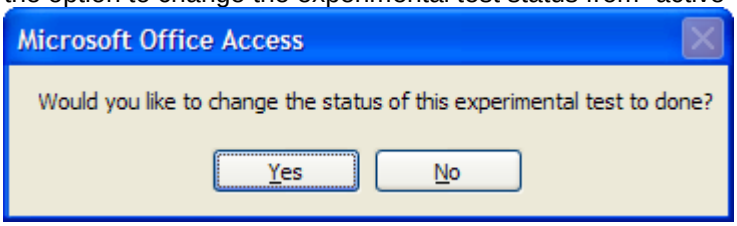
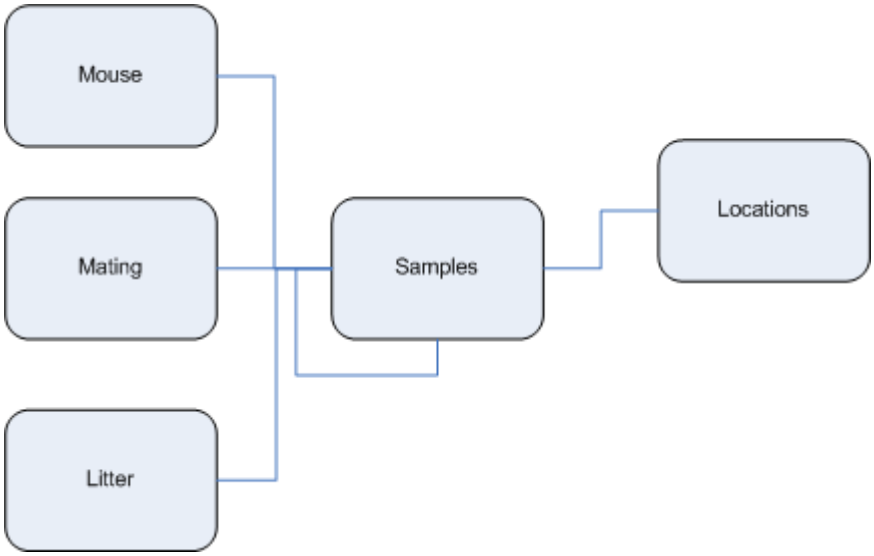


Figure 14-26 Changing the experimental test status

14.18.4 Troubleshooting notes

- Data values, such as comments, cannot contain comma characters because commas are used as data value separators.
- The *test type* selected directly (no plan) or associated with the experimental test when using an experimental plan may not contain data value fields with the captions: Mouse ID, Data Collection Date, or Abnormal Data Flag. These are special captions used by the importation process.
- Do not insert spaces between the commas used to separate missing values. These can be accidentally interpreted as a value. A line of data containing A,B,,,C is not interpreted the same as A, B, , , C. There is no need to follow a comma with a space.
- Some applications insert characters at the beginning of a file that provide information to the application. If the file has the JCMS_DATA token on the first line these special characters may cause it to not find the token. The solution is to insert a blank line at the beginning of the file.

15 Samples



15.1 Set up Controlled Vocabulary for Sample Tracking

The first step in using the sample tracking features is to set up the controlled vocabulary for your lab. Sample tracking has both simple controlled vocabulary (see section 3.3.1) and several more complex controlled vocabularies.

The simple controlled vocabularies for sample tracking are as follows:

1) Epoch: Used to qualify the sample's age
2) Harvest Method: Indicates how the sample was harvested
3) Weight Unit: Units the weight is measured in
4) Sample Date Type: Used to qualify the sample date
5) Sample Status: All potential statuses a sample may be identified with
6) Time Unit: Used for indicating sample age
7) Sample Class: Top level category for a sample

Some values have already been added to these tables. You will want to examine each one and add or remove values as necessary. These values are accessed by clicking on the corresponding button on the Administrative button bar:

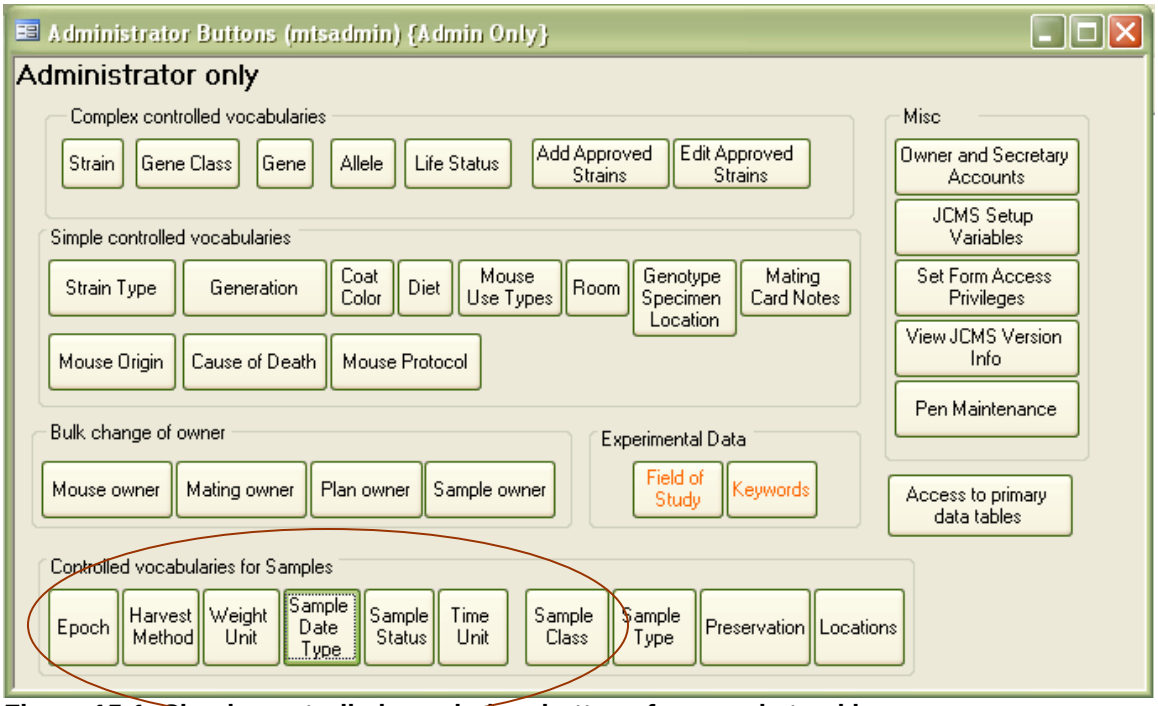


Figure 15-1: Simple controlled vocabulary buttons for sample tracking

After clicking the button, you will see the values in table format:

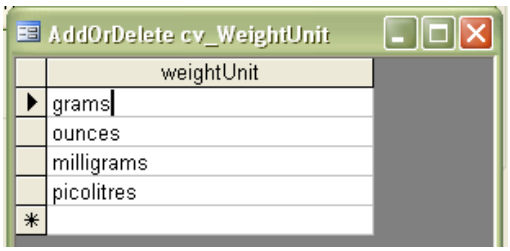


Figure 15-2: Example of editing simple controlled vocabulary

To add a new value, place your cursor in the bottom blank row and type in the new value. You must move your cursor out of that row for the new value to save.

To remove a value from the table, click on the box at the left side of the row in the table. The whole row will be highlighted. Press the delete key. A dialog box will ask for confirmation that the record should be deleted.

See section 3.3.1 for more details regarding simple controlled vocabularies.

In addition, there are three complex controlled vocabularies for sample tracking. They are:

1) Sample Type: Within class, identifies the sample type
2) Preservation (Type, Method, Detail): Values for indicating how the sample is preserved
3) Location: Where the sample resides

As with simple controlled vocabularies, you will add and remove values as necessary. You may do this by clicking the corresponding buttons on the Administrator button bar:

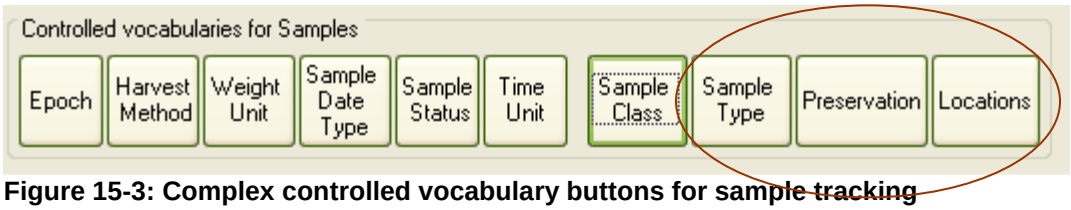


Figure 15-3: Complex controlled vocabulary buttons for sample tracking

To administer sample types, click the Sample Type button. You will see the following screen:

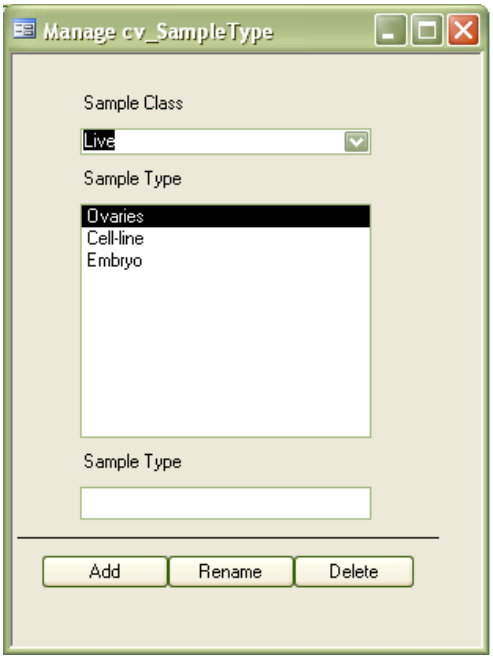


Figure 15-4: Manage sample types screen

To add a sample type, first select the sample class it should belong to from the drop down at the top of the screen. Then enter the value in the Sample Type text box and click Add. To rename one, double click it, update the name, then click Rename. To remove one, highlight it and click remove. You may not remove a type after it has been used for samples.

To administer preservation vocabularies, click the Preservation button the Administrator button bar. You will see this window:

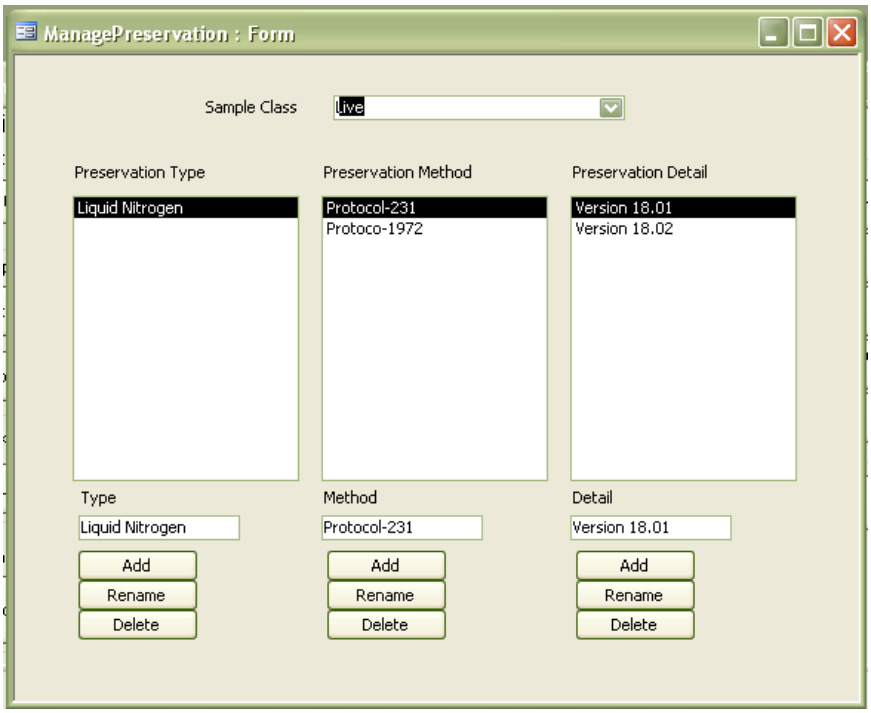


Figure 15-5: Manage preservation vocabularies screen

It is important to remember that, on this screen, the values in a list are relevant only to the selection made in the list to its left, and all values pertain to the selected sample class at the top of the screen. The preservation methods listed pertain to the selected preservation type, and the preservation details pertain to the selected method. To add any value, type the value in the text box below the list and click the Add button. To rename a value, double click it, update the value in the text box and click Rename. To remove a value, highlight it and click Delete. As with other vocabularies, you may not remove an item if it has already been used in a sample record.

Finally, to administer locations in your facility, click the Locations button on the Administrator button bar. Following is the location administration screen:

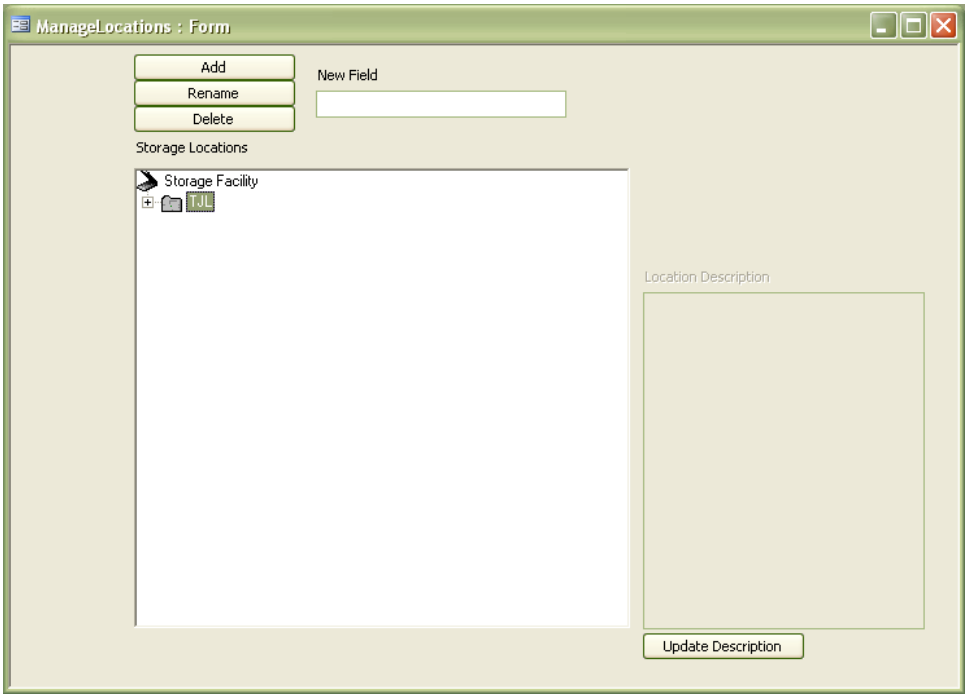


Figure 15-6: Manage sample locations screen

This screen is organized as a “tree view” with “nodes” representing locations. You may expand and collapse the nodes in the tree, and add and remove nodes at any level. For example, you may have a building node under the root level, and beneath that node are room nodes, beneath that may be shelf nodes. This allows you to be as general or specific about locations as necessary. To add a new value, highlight the parent value, type the name in the New Field text box, and click Add. Following the previous example, if you wanted to add a new room to a building, you highlight the building, enter the name of the room, and click Add. To rename a value, highlight it, enter the new name in the New Field text box, and click Rename. To remove a value, highlight it and click Delete. You may also enter text descriptions for any node by typing in the Location description box on the right hand side of the screen, and clicking Update Description.

15.2 Add Samples

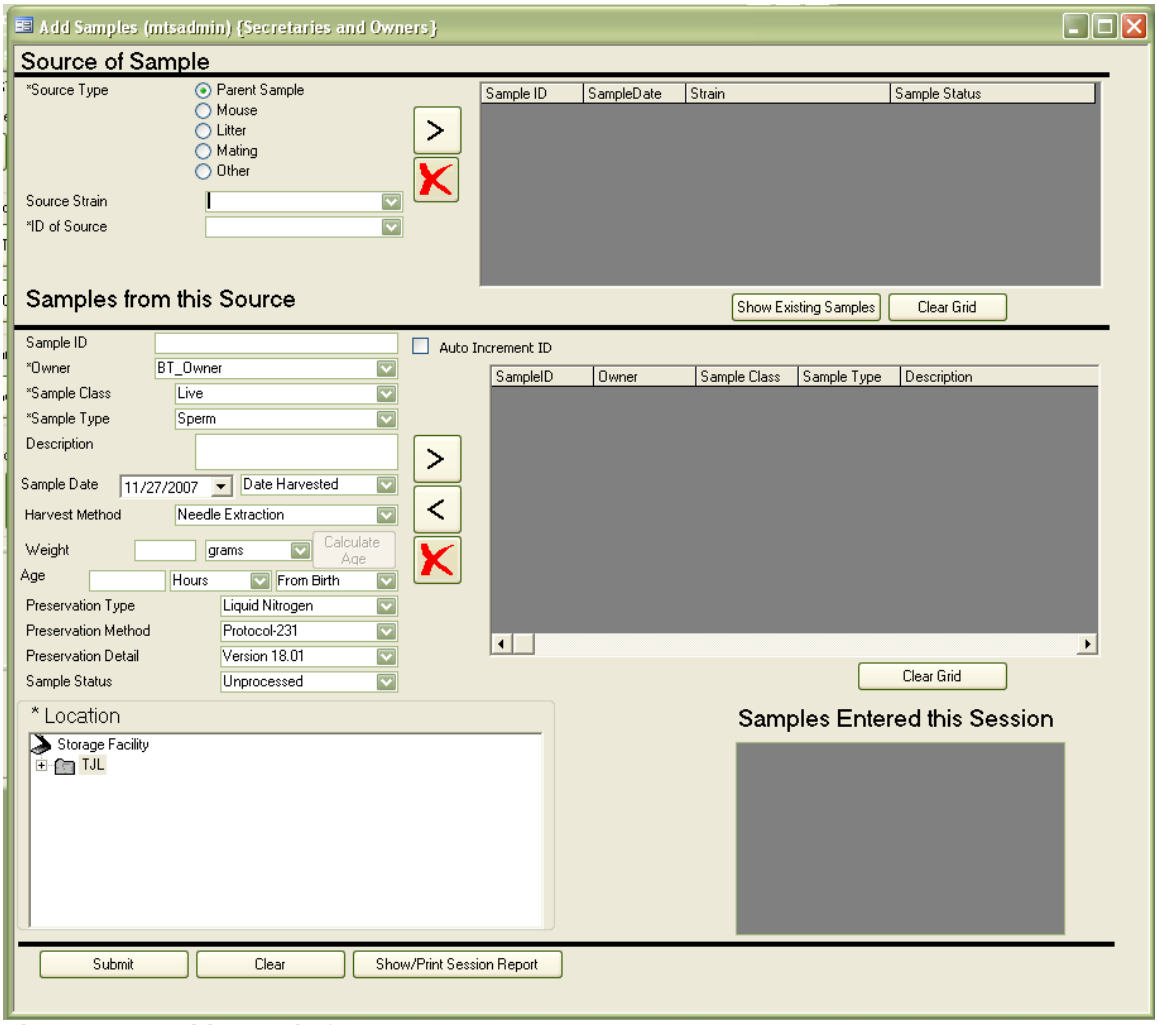


Figure 15-7: Add Sample form

The Add Sample form is accessed by clicking the Add Sample button from the Track Samples section of the button bar. You may use the Add Sample form to add as many samples during a session as necessary. No sample information is saved to the database until you click the Submit button at the bottom left of the screen.

This screen is divided into two sections, the top part is for identifying the source of the sample and the bottom part is for the sample data. Each section contains a grid that can hold one or more items. It is important to understand that a sample or samples may have one or more sources, and a source or sources may have one or more samples associated with it. You may view samples previously entered for the source(s) by clicking the Show Existing Samples button.

The source(s) of a sample may be another sample, a mouse, mating, or litter. There is also an Other option; if this is selected, only the strain is saved as the source of the sample. When you make a selection for the source type, except for the Other option, the ID of Source drop down list is populated with ID's relevant to the source type. For example, if you select a source type of Mouse, the ID's of Source drop down list will contain mouse ID's. You may filter this list by choosing a strain from the Strain drop down list. To select an item from the list as a source, select it in the ID's of Source drop down list and click the ">" button to move it into the source

grid. The source grid indicates the source(s) that you have selected for this sample. If multiple sources are indicated, they must be of the same type. For example, you may not indicate both a mouse and a litter as the sources for a sample. In addition, the sources selected must be of the same strain. If you would like to remove a source from the selected sources grid, highlight it and click the red "X" button.

When you are finished identifying the source(s), you may enter the sample information. Each sample is identified by a Sample ID, and these must be unique. You may enable the system to generate these for you by checking Auto-generate ID. When using this, you will indicate the format you would like to use with the first sample you enter, and the system will then use that format for subsequent samples. For example, if you would like to enter five samples in the format S_01, S_02, S_03, S_04, and S_05, enter the first one (S_01) and the system will increment the numeric digits for the remaining samples. Required data entry fields are identified with asterisks. You must indicate the sample's class and type (i.e. Live, Embryo) and you will notice that the values for the sample type are based on the selected sample class. Values in the drop down lists for Preservation Type, Method, and Detail are dependent on the selection for Sample Type. Note that the sample date, weight, and age have both a data entry box and one or more drop down lists to qualify the value. For example, you may enter a value for age, and then use the drop down lists to indicate the time units and how the age is measured. The Calculate Age button may be used to automatically generate the age based on the relevant date of the source. Relevant dates are birth date for mouse, mating date for mating, and litter born date for litter. If you have more than one source indicated, and the relevant dates are different (i.e. two mice with different born dates,) the Calculate Age button will be disabled. The sample's location is specified by using the location "Tree" at the bottom left side of the screen. You may expand the tree by clicking on the "+" to the left of any branch of the tree, allowing you to drill down to whatever level of detail is necessary. You may select any branch of the tree at any level, which allows saving the location from something as general as a building, to something as specific as a box on a shelf in a room in a building.

After entering the sample information, use the ">" button next to the sample grid to move the sample into the grid. You may then repeat the process to additional samples to the grid. All samples added to the grid will be associated with the source(s) you identified in the first step. If you need to remove a sample from the grid, highlight it and click the red "X" button. Note that both the source and samples grids have a Clear Grid button that will remove all entries from that grid. You may edit a sample in the grid by highlighting it and clicking the "<" button, updating the data on the left and then clicking the ">" button.

When your samples grid is complete and you are ready to save, click the Submit button. This enters the samples into the database, and the rows in the grid will turn green to indicate that they were saved successfully. You may then either close the form or continue entering additional samples. The Clear button at the bottom of the screen will clear all values so that you can start entering a new set of samples. Everything that you enter will appear in the Samples Entered this Session list.

15.3 Edit Samples

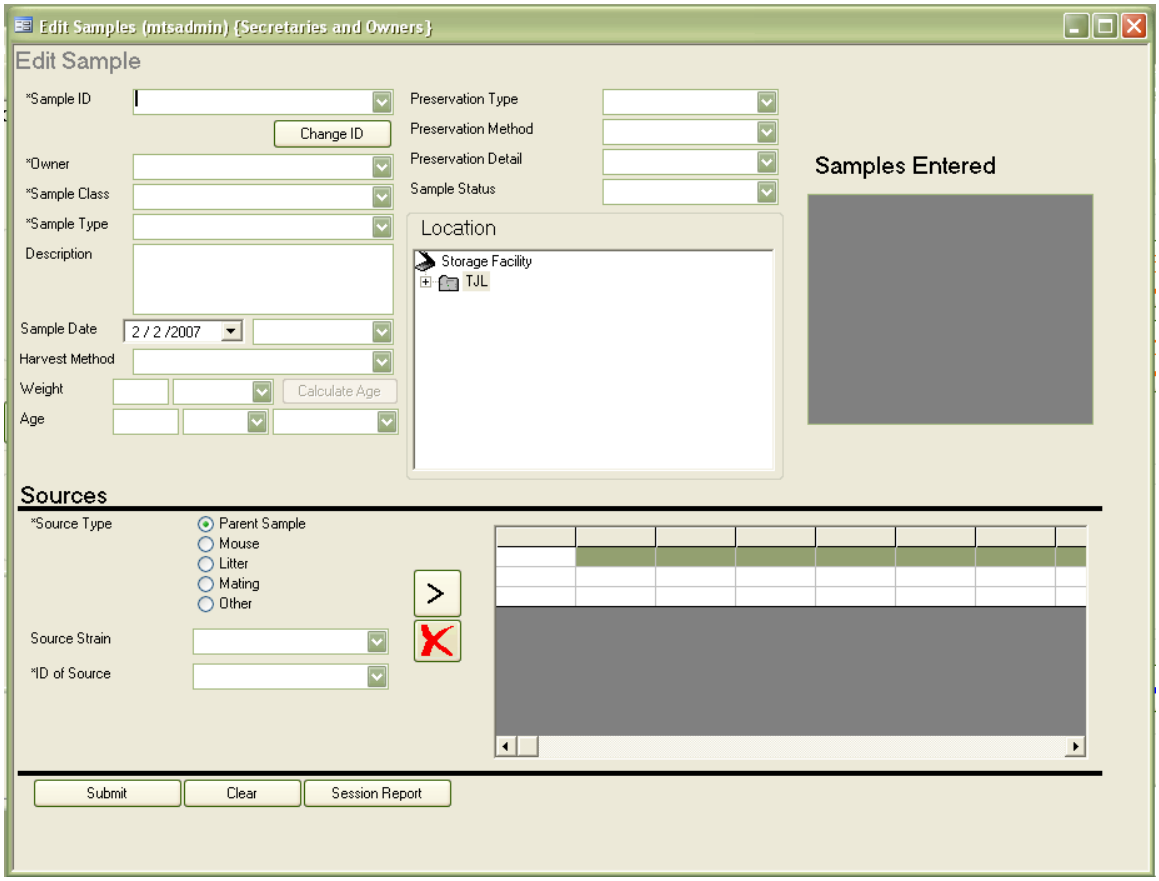


Figure 15-8: Edit Sample Form

The Edit Sample form is accessed by clicking the Edit Sample button from the Track Samples section of the button bar. All data about a sample, including its source(s), may be updated on the edit sample screen. This screen is used to update one sample at a time. The first step is to select the Sample ID of the sample you wish to update from the Sample ID drop down list at the top of the screen. After selecting a sample, you may make whatever updates are necessary. The data entry fields on this screen function the same way as their corresponding data entry fields on the Add Sample screen. After the information has been updated, click the Submit button to save your changes.

15.4 Bulk Change Samples

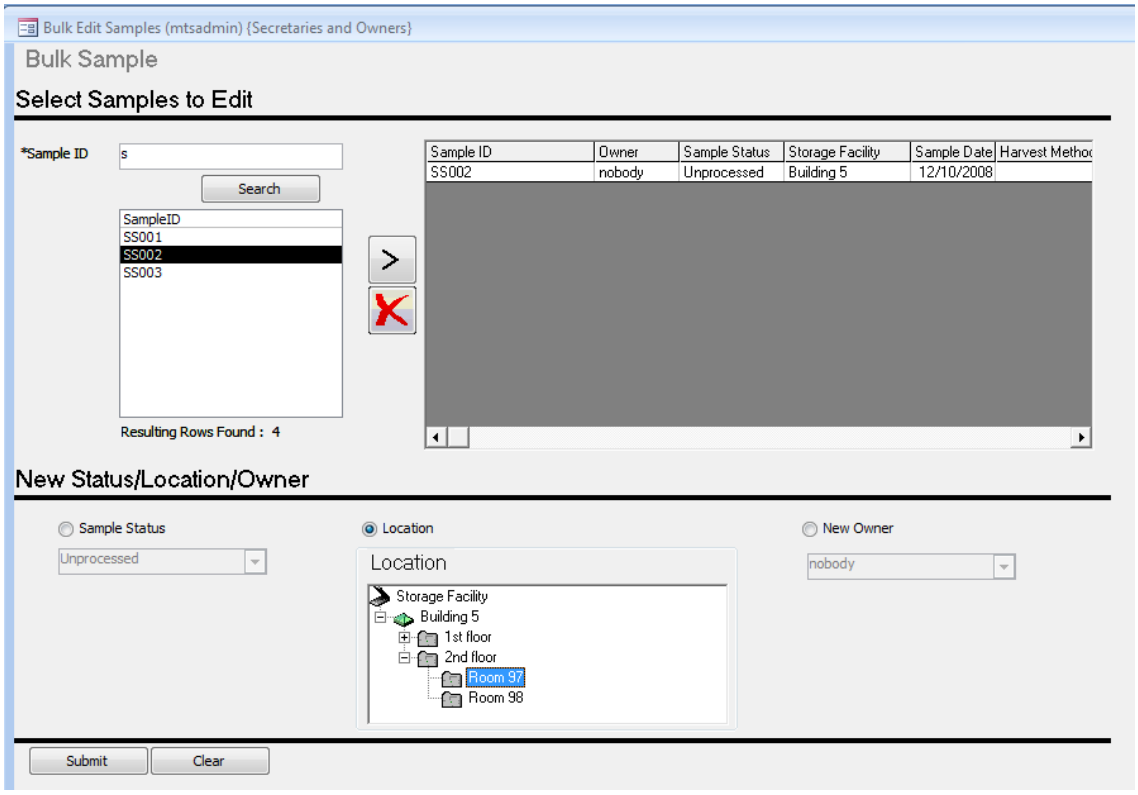


Figure 15-9: Bulk Sample Update Form

JCMS Sample Tracking provides a specialized screen for bulk updates to a group of samples to change their status, location, and/or owner. To get to this screen, click the Bulk Sample Update button on the Main Menu Bar.

The top half of this screen is used for indicating the group of samples to be updated. This is done by searching for samples by Sample ID, selecting one or more samples from the search results, and moving them into the selected samples grid. You may enter a full or partial sample ID in the Sample ID box, then click the Search button. Samples matching the search criteria will appear in the search results list. Select one or more samples by highlighting them, and click the ">" button to move the samples into the selected samples grid. You may perform as many searches as necessary to fill the selected samples grid. As on the Add Sample screen, you may remove a sample by highlighting it and clicking the red "X" button.

On the bottom half of the screen, select one of the update options, and then select the new value to be applied. When the submit button is clicked, the updated value will be applied to all samples in the grid. You may make additional updates if necessary. For example, to change a status and location for a group of samples, you would first select Sample Status and pick the new status and click Submit. Then you would select Sample Location and pick the new location value and click Submit.

Only samples belonging to the logged in user may be transferred to a new owner using this form. If ownership transfers by an administrator from one owner to another are desired, the Bulk Change of Ownership form, under Admin Functions, is used.

15.5 Query Samples

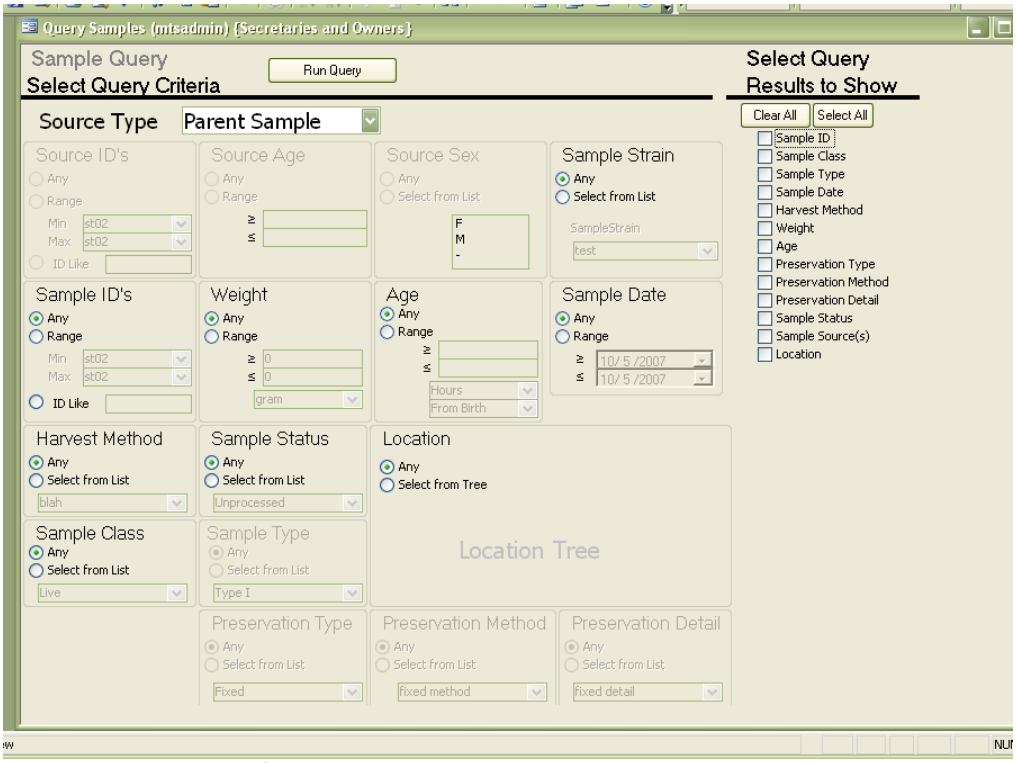


Figure 15-10: Query Samples Form

This screen is accessed by clicking the Query Samples button on the main menu. It is used for producing a query and obtaining results for samples. It allows maximum flexibility, as you may select any combination of sample information to filter your results, and you have control over which output values you would like to view. If you wish to see all results for a specific search criteria, leave the selection at the default "Any." If you would like to narrow results, select a value either by typing it in or selecting it from the drop down list where applicable. Where possible, you may also enter a range of values. Use the check box list along the right hand side of the screen to select which values you would like to be included in your results.

Search criteria on this screen may be enabled or disabled based on a selection made in another area. This happens if the two search criteria are dependent on each other. For example, sample type and preservation information are dependent on the sample class. When you select "Histology" for sample class, the sample status, sample type, and preservation type areas became enabled. When you select a specific preservation type, rather than "Any," the preservation method area becomes enabled, and so forth. This allows you to "drill down" into the dependent information.

When you have made your query selections, click the Run Query button and you will see your results in tabular format.

15.6 Browse Sample Storage Locations

Use this form to display a listing of all samples in a particular location.

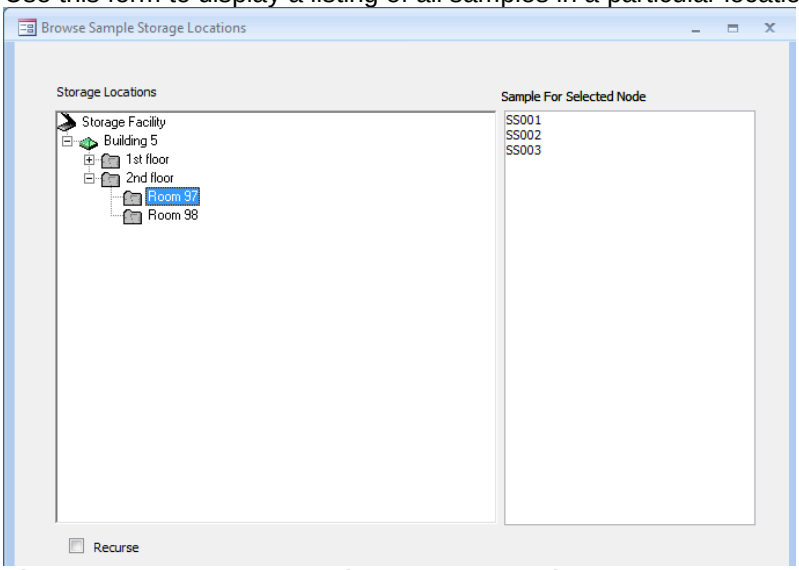


Figure 15-11 Browse Sample Storage Locations Form

15.7 Print Sample Labels

A button on both the Add Sample and Edit Samples forms called “Print Sample Labels” will open the Print Sample Labels form, shown below in Figure 15-12. This form allows you to print samples selected by searching on the Sample ID value. First configure the label parameters by indicating the height of the label, font size, and whether you want text or bar coded labels. After that, select the samples to print. Similar to the mechanism for selecting samples to edit, you enter a full or partial sample ID value, click “Search,” then select samples for printing based on the search results. To select a sample for printing, highlight it in the search results list and click the right arrow (“>”) button. You may select multiple values by using the shift (consecutive select) and control (non-consecutive select) keys. You may remove samples from the samples to print list by highlighting them and clicking the remove (“X”) button, or you can clear the entire list by clicking the “Clear List” button. After you have set the label parameters and selected samples to print, click the “Preview” button. This will bring up the print preview window, and if everything looks correct you may print the labels on your printer from there.

Note: The JCMS Setup variable JCMS_SAMPLE_LABEL_REPORT indicates which is report is run when the “Preview” button is clicked. This value defaults to the PrintSampleLabels report. However, if a custom label report is created, the setup variable may be changed to run the custom report instead.

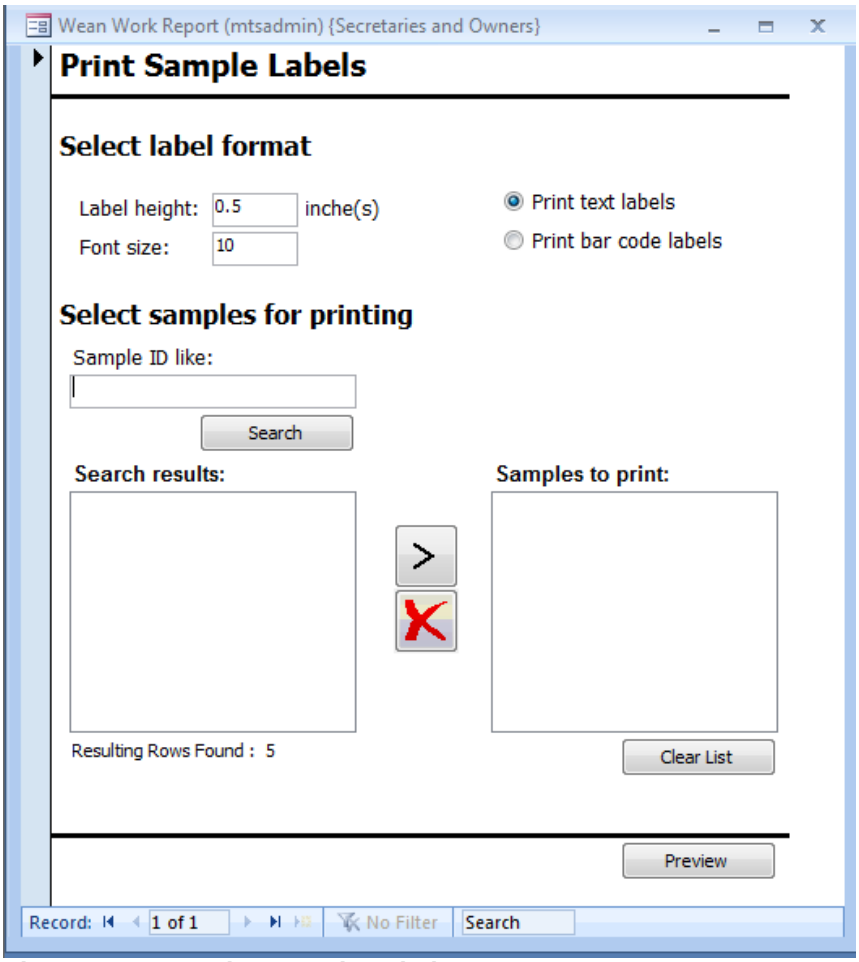


Figure 15-1212 Print Sample Labels

16 Genotype Loader

The Genotype loader utility imports genotyping information and maps the rows and columns from the comma separated file to tables in the JCMS database. The result of the importation will be a set of new genotyping records for a given mouse.

The software reads a formatted input file, parses it, validates it, and automatically populates the genotype records for the mice identified in the file.

Each file can be successfully loaded only once. If the user tries to load the file a second time it will generate error messages.

NB: This utility was originally written for an internal customer who needed to import SNPs. Therefore, the acronym SNP may appear occasionally. The user can justifiably substitute the word “gene marker” or “gene”. The resulting records are the same.

The JCMS setup variable JCMS_ENABLE_GENOTYPE_IMPORT must be set to true in order to bulk import genotype information from a file.

16.1 Input file format

There are a number of rules concerning the format of the input file. These are described fully in this section of the user guide.

The input file is a comma separated value (CSV) file. A CSV file has one row per line and columns separated by commas. The file can be created by any text editor or can be generated from Microsoft Excel. Only CSV files are accepted by the genotype loader.

The contents of **row one, column one** must contain the string:

```
JAX-CMS SNP Genotype Import vers 1.0
```

If this value is not present then we will abort the importation.

Row one, column four starts the *gene* identifiers. If these do not appear in the Gene table in JCMS then they will be added.

In **row two, column four** begin the *gene class* identifiers. These are optional.

Beginning in **row three, columns one through three** are the *Mouse ID*, a *Vial ID*, and a *Position* id, respectively. These values must be unique throughout the file. Stated another way, they can only appear in an input file once.

Columns four to the end of the line contain the allele identifiers associated with the genes from row one of the same column.

Alleles have a confidence level associated with them. Please note that when loading genotype data from a CSV file the confidence level is automatically set to high. You can modify this by using the **Edit Genotype** form.

Parsing of the input file stops when :

1. the mouse ID column is empty OR
2. the gene marker column is empty OR
3. the allele column is empty.

Figure 16.1 below is an example of an input file as shown in Excel.

Example import file:

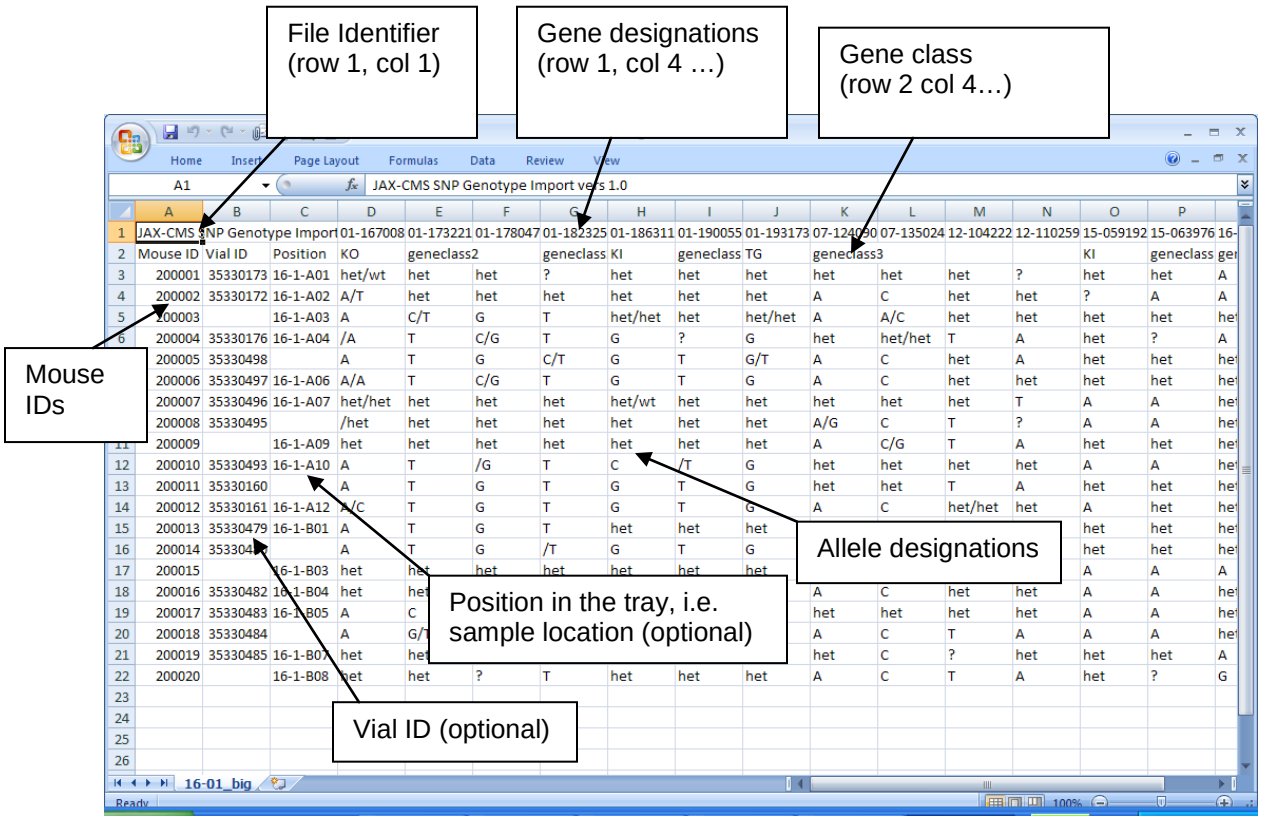


Figure 16-1 Spreadsheet: The input file as seen in Excel

Below is a table lists the components of the input file and whether they are mandatory or not. The column values are case insensitive.

The following table provides more details about the values in the columns, their meaning, and how they map to the JCMS database tables.

Field	Mandatory	Properties	Description *[Table.column]*
Mouse ID	Yes	Alphanumeric, 16 characters maximum	Unique identifier. Mouse IDs must exist in the database prior to importing the file. *[Mouse.ID]*
Vial id	No	Alphanumeric, 16 characters maximum	Maps to the *sampleVialID* tag field. Must be unique. *[Mouse.sampleVialID]*
Position	No	Alphanumeric, 16 characters maximum	Maps to the *sampleVialTagPosition*. *[Mouse.sampleVialTagPosition]*
Gene class ID	No	Alphanumeric, 16 characters maximum	Optional field. If present identifies a class of genes. *[cv_GeneClass.GeneClass* and *Gene.geneClass* fields]
Gene markers	Yes	Alphanumeric, 32 characters maximum	Treated as gene names. [*Gene.labSymbol*]
Allele designations	Yes	Alphanumeric, 8 characters maximum.	Associated with the gene marker (Gene) not the gene class. *[Allele.allele, Genoytpe.allele1, and Genoytpe.allele2]*

The mapping of the input fields to the data tables.

Alleles

Alleles can be represented four ways in the input file. The table below lists the four ways along with examples and the results produced by the example.

Allele representation	Example	Result
Two string separated by a slash	“abc/xyz”	Allele1 = “abc”, allele2 = “xyz”
A single string	“hom”	Allele1 = “hom”, allele2 = “”
A string followed by a slash	“cre1 /”	Allele1 = “cre1”, allele2 = “”
A slash followed by a string	“/cre1”	Allele1 = “”, allele2 = “cre1”

The following table list the tests performed and exceptions caught.

Rule	Exception	Action
Row one, column one does not contain a valid genotype file identifier.	File is not an import file.	Popup message box: “The file <filename> does not appear to be a valid JAX-CMS formatted genotype importation file.” <ok> After clicking OK the file dialog exits.
All mice IDs from the input file must exist in the database.	A mouse ID is not found	Record the error as “Mouse Id doesn’t exist in the database, no allele and genotype records are created for that mouse id’ in the error log generated at the end and skip this mouse record in the file.
Mouse record must have an empty vialID or it must match the current value.	Mouse record has a sampleVialID that is not NULL and is different from the value we are trying to write.	Record the error as “Vial id doesn’t match the value in the input file’ in the error log generated at the end and don’t update the mouse record.
If a gene name (marker) exists in the database then the gene class in the input file must match.	Gene and Gene class tuple from input file do not match what is in the database.	Record the error as ‘Gene already exists in the database but geneclass doesn’t match the value in the input file” in the error log generated at the end and do not add the gene / gene class tuple to the database.
Input file must be in a valid format (con’t)	File is a valid file but does not conform to the expected format.	Popup message box: “input file <filename> is not in a valid format. <additional info>” (ok) The validation dialog remains visible with the error message and any additional info entered into the ‘details’ box but the only option is the Cancel button.
Mouse ID(s) not unique	Mouse ID (recipient ID) <id> already exists in database at line	Popup message box: “Mouse ID (recipient ID) <id> already exists in database at line <n>.” and abort the operation
Not a CSV file	Invalid file	Popup message box: “Invalid file” and abort the operation
Missing mouse id field in the input file	Missing Mouse ID at line	Popup message box: “Missing Mouse ID at line <n> in the input file” and abort the operation
Missing Gene in the input file	Missing Gene at line	Popup message box: “Missing Gene at line <n>” and abort the operation
Missing Allele in the input file	Invalid Allele at line	Popup message box: “Invalid Allele at line <n>” and abort the operation

16.2 The user interface

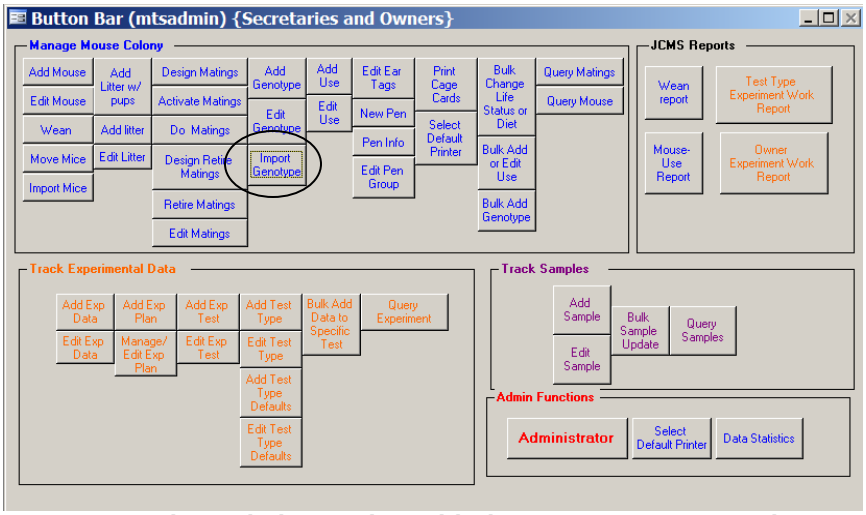


Figure 16-2 Form: The main button bar with the "Import Genotype" button visible

16.2.1 Import Genotype

The “Import Genotype” button appears in the ‘genotype column’ on the main button bar form.

The JCMS setup variable JCMS_ENABLE_GENOTYPE_IMPORT must be set to true in order to bulk import genotype information from a file. This is the default.

When functional, the button brings up a standard file open dialog. See Figure 16-3. The user can browse to files or type in a pathname, including a network (UNC) pathname. It accepts only comma separated files (.csv files).

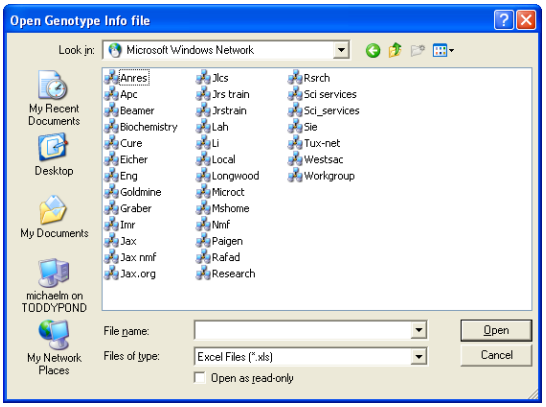


Figure 16-3 The file open dialog

If the user clicks cancel, then message “Request to upload the file was cancelled” is displayed and abort the operation.

If the input file is not a comma separated file the error message “The file xxx.txt is not in a valid format” is displayed and the operation is aborted.

16.2.2 Verification

Once a file is selected and verified, the software runs a series of validations against it. If any of the validations fail, the user will not be able to import the genotypes. If all the validation tests pass, the user may still elect to cancel.

Figures 16-4, 16-5 and 16-6 show the user notification dialog that appears during validation, after a successful validation, and after the import, respectively.

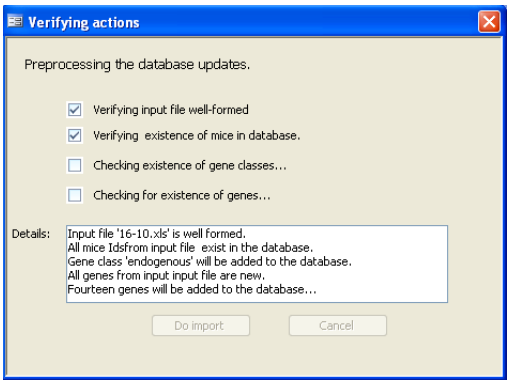


Figure 16-4 The user notification screen during validation

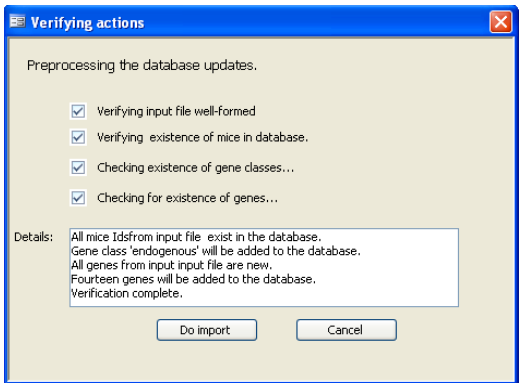


Figure 16-5 The user notification after validation

The validation process:

1. checks the input file contents of row 1, column 1 to be the string “JAX-CMS SNP Genotype Import vers 1.0”, If this value is not present then error message “The file xxx.csv does not appear to be a valid JAX-CMS formatted genotype importation file” is displayed and abort the operation.
2. once the file is validated, the software checks if the gene class from the input file exists in the database, if not it is added the gene class to the database.
3. tests if the gene markers exist in the input file, if not then error message “Gene doesn’t exist” is displayed and aborts the operation. If gene markers exist in the input file then the software checks if the genes from the input file exist in the database, if not the genes are added to the database.

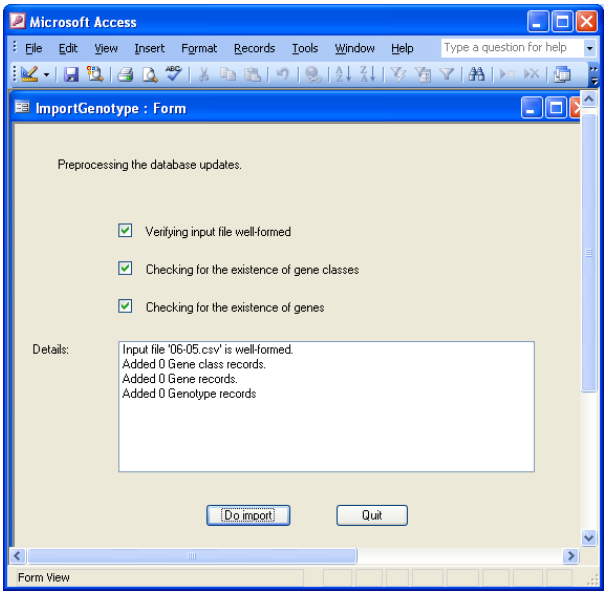


Figure 16-6 The user notification after import

When the user clicks **Import** button, the software:

1. checks if mouse ID from the input file exists in the database. If not it is recorded in the load report and the row is skipped. If it does exist then it checks if user has permissions to edit the mouse.
2. updates the mouse record with new vial Id and vial tag position values
3. checks if the allele from the input file exist in the database, if not add all the new alleles to the database.
4. checks if the genotype record for each mouse, gene and allele exist in the database, if not add all the genotype records with respective mouse, gene and allele to the database

A load report is generated at the end of the import process.

Genotype Load Report

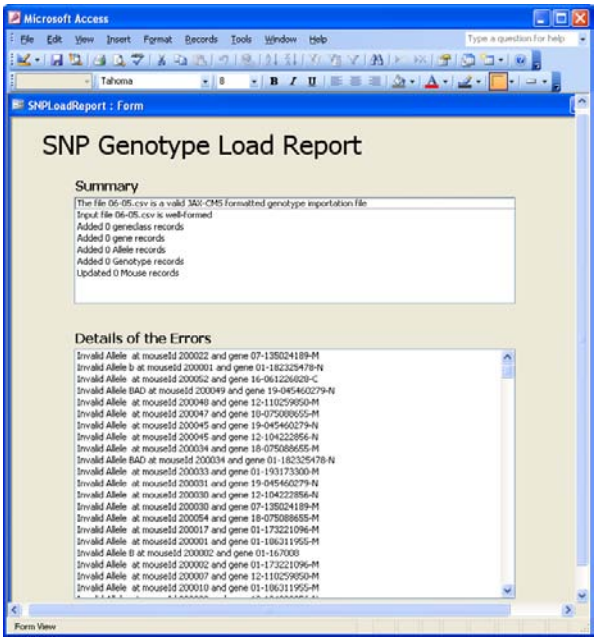


Figure 16-7 Genotype Load Report

This form is invoked from the Import Genotype form after the importation process is done. It gives the summary of the input file verification, count of gene classes added, genes added, alleles added, genotypes added and mice updated in the database. Also gives the list of errors encountered during the importation process.

17 FAQ's (Frequently Asked Questions)

17.1.1 JCMS starts up and shows the database, but no welcome window appears.

JCMS should show the welcome window when it starts up. From the Tools menu select "startup". In the startup dialog select the JCMS welcome window to display automatically (*display Form/Page*) when the application starts.

17.1.2 Every time I add, edit, or delete a record in JCMS I'm prompted with a dialog box.

MS Access has an option that allows this feature to be turned on or off. See the section titled configure some database options in the Installation section for a description of how to turn off the confirm options.

17.1.3 What to do about an "end/debug" error message

Occasionally an error dialog box will be displayed with two buttons, *end* and *debug*. This dialog box is displayed only when the program encounters a serious bug. If you see this dialog box you should write down information about what you were doing at the time and contact your Administrator as soon as possible. If your Administrator is not available, select the "end" button and close any program code windows that are left open. You can check your data entry via the various JCMS query forms. If the data looks okay, then continue to work, but be sure to report the bug so it can be fixed in the next release.

Oftentimes, the bug is a minor thing that can be worked around until the next release. If you detect a data problem, stop all data entry and report the problem immediately.

17.1.4 Error messages when editing date fields

Why are date fields giving error messages when edited?

Problem: If the format the dates are in is MM/DD/YYYY (a 4 digit year), when this is edited, JCMS expects the date to be in the format MM/DD/YY (a 2 digit year) and gives an error. Most of the dates have now been changed to use a pick control, eliminating this problem.

Solution: Remember to highlight the whole field when editing and enter the whole date with a two digit year. A second, more permanent solution is to change the computer to use two digit dates. From the Start button, choose Settings – Control Panel. Double click on the Regional Settings Icon. Click on the date tab. Change the "Short date style" to mm/dd/yy. This will change how all dates on this computer are displayed.

17.1.5 Error message: "user Admin does not have permission to use this form"

JCMS does not recognize user *Admin* as a JCMS Administrator. In fact, JCMS prevents user *Admin* from working in JCMS at all. In order to use JCMS you need to be logged in as *mtsadmin*, an owner, or a secretary of an owner. NOTE: Microsoft Access will not prompt for a login unless user Admin has a password. So assign a password to the Admin user before using JCMS. See the Installation section on initializing passwords for more information about user accounts.

17.1.6 Error message about "could not find file"

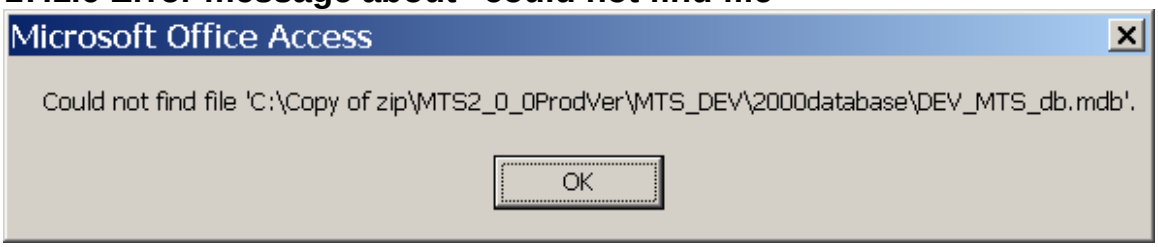


Figure 17-1 Could Not Find File Error

The most common reason for this error message is that the file server is not available over the network. JCMS is looking for the linked data tables located on the file server. This message also occurs if the data tables have been moved and the client interface has not been updated to re-link the tables. A message similar to this may appear during the server or client installation before the re-link data tables step has been completed.

17.1.7 A note about session boxes

Session boxes provide a history list for the data entry person. MS Access limits the size of this list to 2048 characters long (including some format characters that do not display in the box). If the session box string grows to long, JCMS will warn that the string will be reset soon. You can keep working and the session box will reset before the MS Access limit is reached. The only loss to the user is the history list starts over again. NO DATA IS LOST when you see the warning message or when the session box is reset.

17.1.8 List boxes of mice information are scrambled!

On several forms, there are list boxes with rows of mouse information (e.g., the Bulk Add/Edit forms). The rows of data in these list boxes sometimes get messed up if there are semicolons or commas in the data. Oftentimes, users put commas into strain names and this will cause the problem. The easy fix: remove any commas or semicolons from strain names or any other

controlled vocabulary tables. If this doesn't solve the problem, report the bug to the Jackson Laboratory.

17.1.9 Warning message about not saving a record.

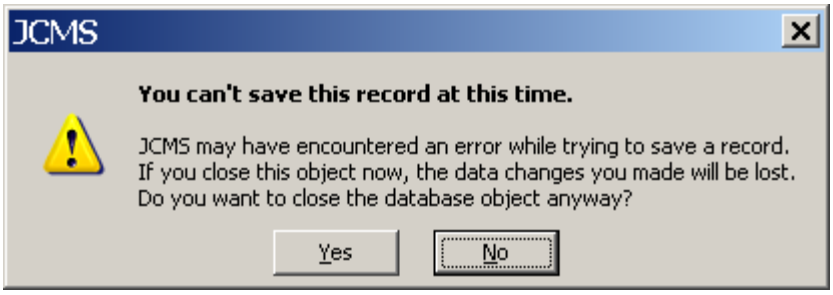


Figure 17-2 Error: You can't save this record at this time

This message appears when there was an error on the form that was not corrected. This type of error may be something such as an invalid date or entering something that is not in a pick list. Answer yes if the information on the form was not supposed to be submitted / entered into the database and the form should just be closed. Answer no if the information needs to be entered and correct the information on the form, then resubmit it.

18 Technical Guide

18.1 Security

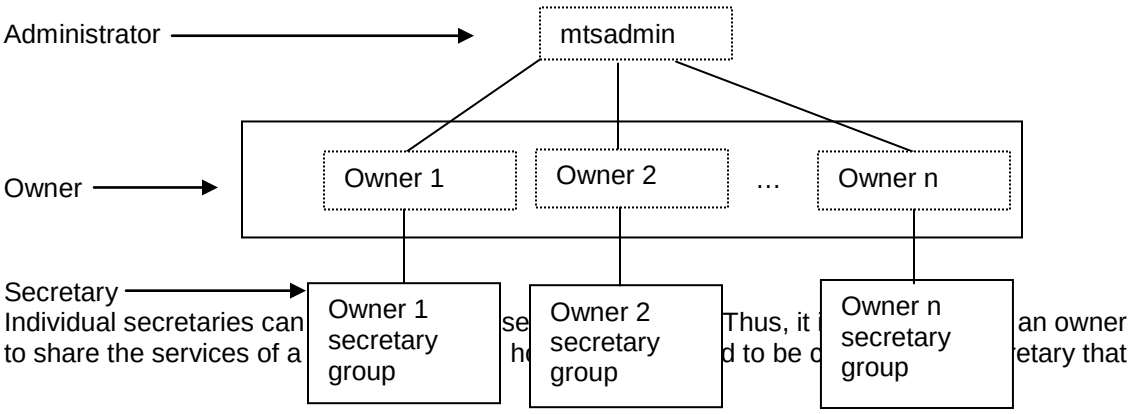
The JCMS security implementation is based on the premise that people who have access to JCMS are not malicious. JCMS security is therefore limited to trying to prevent accidental changes to the database.

JCMS has two components, an interface component and a database component. The interface component is installed on all workstations that require access to the database. Each installation of the interface component has its own set of user accounts.

Data security is implemented as a hierarchy with two parameters: access level (horizontal) and ownership (vertical). Higher access levels inherit all access permissions from lower access levels plus additional permissions associated with the higher level.

The vertical access parameter (ownership) comes into play only when a user attempts to submit a record-update or a record-addition to an ownership-protected table in the database.

We define three security access levels: Administrator, Owner, and Secretary. In the diagram below, groups are illustrated in solid outlined boxes. An individual login account can belong to only one access level. In practice this means that secretaries can belong to more than one secretary group (secretary level is the only level that has more than one group associated with it). Also note there is exactly one mtsadmin.



belongs to more than one owner-secretary group will have the ability to edit records owned by all owners associated with the secretary in the same edit session. It may be a better administrative policy to give one person more than one access account (log in name) if needed.

Four tables in the database have an owner field: Mouse, Mating, ExpPlan, and ExpData. Litters inherit ownership from their mating. When editing involves Mouse, Mating, Litter, Experimental Plan, or Experimental Data, access to the records is restricted by owner.

18.2 Changing Security Access to Forms

Access to the database is restricted by the form interface. That is, each form is assigned an access security level. Users *cannot* use forms that have a higher security level than their assigned level. The opposite is also true; users can use all forms with security level less than or equal to their assigned security level. The mtsadmin has the highest access level and therefore has complete access to the database.

The DbFormPrivileges table controls the access security level (or privilege level) for certain forms. The administrator may change the level between secretary, owner, and administrator for these forms by using the Set Form Access Privileges button on the Administrator button bar. The forms not listed in this table are required to stay at a certain security level. Any changes will take effect the next time JCMS is started by a particular user.

18.3 Data Integrity

Data integrity is only loosely enforced. If all data are entered through the user interface forms, then data integrity will not be a problem. There is one important exception. It is possible for users to conflict in their usage of the database. If multiple users access the database simultaneously and change records there is the possibility of conflicting edits.

18.4 The Dbinfo Table

The Dbinfo table has release information in it as well as counters for maximum pen number and maximum auto mouse ID number and maximum auto litter ID number.

18.5 Access to the Primary Data Tables

JCMS allows access to the primary tables through a set of data-sheet forms. Use this level of access to the data only sparingly to correct mistakes in data entry. Entering or changing data this way can cause the data to have multiple problems because the normal forms interface enforces business rules which will not be enforced here.

From the Administrator button bar (click the Administrator button on the main button bar), click the button labeled *Access to primary data tables*.

Each table can be opened in “datasheet view,” which appears similar to a spreadsheet. Use the scroll bars to navigate. Click on the column headers and drag to resize them if some of the information in the field is not visible.

18.5.1 Editing Records in Datasheet View

Any field that is typed in will be changed by the database as soon as the cursor moves into another field. Some changes will not be allowed and will generate an error message.

Add records by scrolling to the bottom of the list and entering the new record into the bottom row. It is not allowed to add the record unless values are entered into all of the required fields. Adding will occur when the mouse is clicked on a different row. A **key** must be entered into any field with a name that begins _xxx_key. The key should be a number one larger than in the previous row. This is an internal number that normally is not visible. The database is using this key field to keep

track of the records. When the forms are used, the database is generating this number automatically. When the tables are used in datasheet view, this number must be added manually.

To delete records from the table, click on the box at the left side of the row in the table. The whole row will be highlighted. Press the delete key. A dialog box will ask confirmation that a record should be deleted.

18.6 Temporary Tables

JCMS creates temporary tables for storing query results that are generated by the user query forms (e.g. query matings) and some of the experimental data forms. Temporary tables are bound to the query output form (i.e., the results of the query) or other screen forms. When the query results form is deleted or other forms are closed, the temporary tables can be removed.

When JCMS starts up it attempts to delete all temporary tables. If a table is still bound to a form then it may not get deleted. An Administrator can delete temporary tables, but be aware that if one of the client installations currently has a query results form bound to the table, the temporary table could be locked (undeletable).

MTSTemp – These temporary tables are nameed MTSTemp*X*. *X* in the name MTSTemp*X* is an integer that makes the current temporary table name unique in the tables collection. Temporary tables that are not bound to any form are deleted on startup.

18.7 Screen Resolution

The forms used by this system are rather large and take up quite a bit of screen space. Every effort has been made to make them fit on a normal screen. Many just fit with a screen resolution of 800x600 on a 17” screen. For a smaller screen, try using a higher resolution such as 1024x768. Otherwise, some forms will have to be scrolled to see the entire contents.

18.8 Printer Notes

The cage card reports use the default printer and default paper location. Many modern printers will use the sheet feeder as the default whenever there is paper in the sheet feeder. To print cage cards, open the sheet feeder and load the cards into the envelope feeder part of it. Also set the printer to use as straight a paper path as possible. Many printers have an option for sending sheets out the back if it is open or have a toggle switch to change the path.

The cage cards are designed to print on either the upper left side or center of the paper depending on the card format used. If the envelope feeder places the cards in another location, a programmer will have to change the margin settings to match the location of the envelope feeder.

It is possible to have a programmer customize what printer and paper location is used by changing the File-Page Settings information in the Design View for an individual report.