InvenTree was developed and is distributed by Solutions by Lehman based in Mishawaka, Indiana. Solutions by Lehman works in conjunction with Lehman and Lehman, a landscape architect and planning firm. InvenTree is a set of template files that use FileMaker's FileMaker Pro database program which must be purchased in addition to InvenTree. The template files contain preformatted fields, layouts, and scripts designed for tree inventories and management. Solutions by Lehman prefers to limit their services to the Midwest, where there are over six communities using InvenTree.

▲ *Figure 3.3.1: Inventree startup screen.*

Services

- Landscape planning and architecture
- Computer application development
- Inventories

System requirements

PC:
- Windows® 3.1, 95, 98, NT®
- 3 MB hard disk space
- 8 MB RAM
- FileMaker Pro

Macintosh:
- System 7 or later
- 4 MB RAM
- FileMaker Pro
- 14" monitor (recommended)

InvenTree was primarily used on a Gateway™ G6-200 Pentium® Pro PC using Windows NT®. InvenTree was also used with Windows® 95 and 98, on a Gateway™ P5-166 Pentium® PC and a G6-300 Pentium® II PC, respectively. The FileMaker Pro directory uses 28,600 KB of hard disk space, and the InvenTree template files use an additional 1,018 KB. After entering data for 454 tree sites, the InvenTree template files increased in size to 1,189 KB. Therefore 1,000 tree sites would require approximately 377 KB (0.37 MB).

Software cost

InvenTree is purchased from Solutions by Lehman for $500.00. FileMaker Pro 4.1 for Windows® costs $177.99, and for Macintosh costs $179.99 (prices from PCMall).

Technical support

Inventree is provided with a 30 page manual. FileMaker Pro is provided with a 310 page bound manual along with online documentation. Phone support is offered at no cost.

Contact

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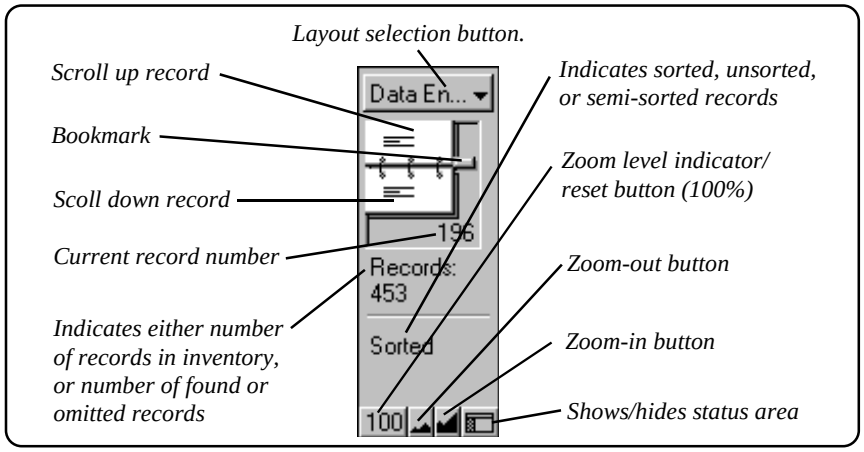
202 Lincolnway East
Mishawaka, IN 46544-2042

Phone: (219) 256-9267
Fax: (219) 257-1966
Email: charlesl41@aol.com



▲ *Figure 3.3.2: FileMaker Pro status area.*

The **bold** text in the following description refers to window and screen names. *Italicized* text refers to either commands, field names, or field list selections.

General preferences

The InvenTree **startup** screen is shown by default when the program is started (Figure 3.3.1). The FileMaker Pro **status area** contains controls and information that are referenced later in this section (Figure 3.3.2).

General preferences are set in the **document preferences** window. These include configuring FileMaker Pro to use a default password and open a default screen during program startup (Figure 3.3.3). FileMaker Pro also offers a spell-checker. When spell-checking is enabled FileMaker Pro will either play the Windows default sound (configured in the **sounds properties** control panel window) or will flash the FileMaker Pro title bar when questionable spellings are encountered.

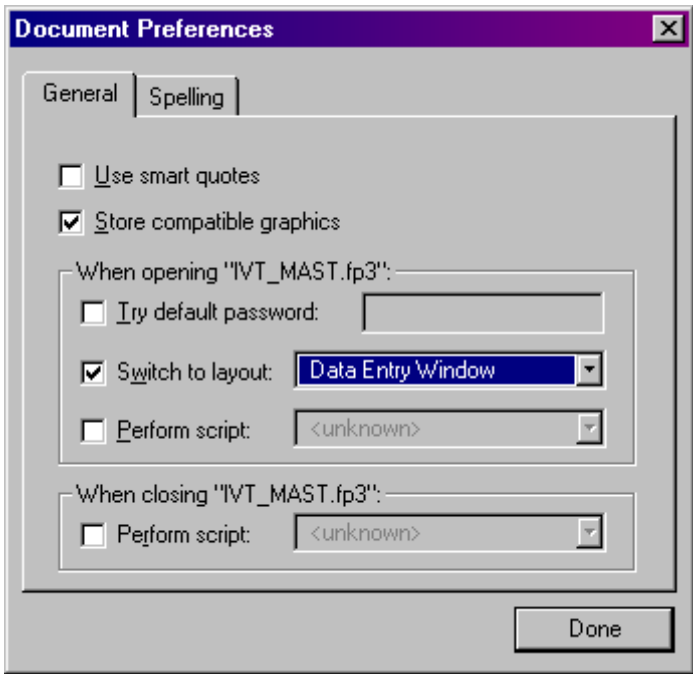


Figure 3.3.3: The document preferences window is used to set preferences during InvenTree startup and closing. Options can also be set for spell-checking.

Defining access privileges

The minimum access privilege that a password can have is the ability to *browse* or view records (Figure 3.3.4). Any combination of privileges including *editing*, *creating*, *deleting*, *printing*, and *exporting records* can be set for a password. One of three levels of menu command access can be selected for a password, including *normal* (enable all menu commands), *editing* (enable only basic editing and data entry commands), and *none* (disable all menu commands). Menu selections not available for a password are grayed-out when the user logs-in. FileMaker Pro also allows for defining access *groups*. A *group* contains several passwords, where either *accessible*, *not accessible*, or *read only* access privileges are granted to specified layouts and fields (Figure 3.3.5). Layouts refer to screens such as **startup** (Figure 3.3.1) and **data entry**. Users with passwords that have limited access can not modify access privileges.

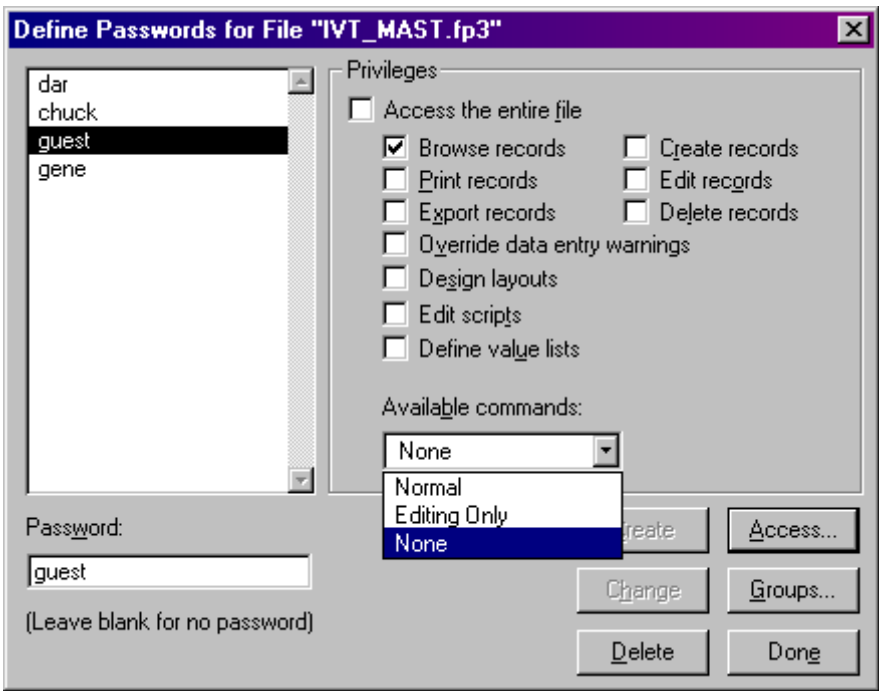


Figure 3.3.4: Access privileges including browsing, creating, printing, editing, and deleting records are assigned to passwords. One of three levels of menu command access can be assigned to a password.

Defining value lists

Value lists refer to fields that contain selectable data, such as drop-down lists. InvenTree uses *value lists* for *species*, *treelawn width*, *limitations*, *actions needed*, *street*, *condition*, *neighborhood*, *request date*, *work plans*, and *action priority* fields. These are described later in this section. All *value lists* are defined in a similar manner in the **define value lists** window (Figure 3.3.6). In the example shown *condition* ratings from *good* to *dead* are assigned. Values for these lists are entered in the order that they appear in the **data entry** screen.

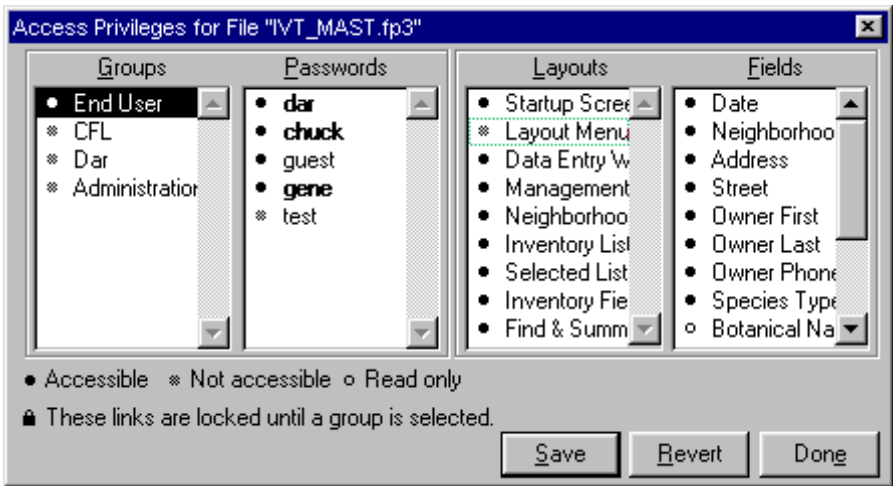


Figure 3.3.5: Passwords can be assigned to groups in order to define global layout and field access privileges.

Defining species

Tree species information is stored in a separate database and is defined in a different manner to the *value lists* described above. Tree species are added, edited, and deleted in the **plant listing** screen (Figure 3.3.7). A *code*, *botanical name*, *common name*, *height*, *spread*, and *remarks* can be entered for each tree species. Entering data into any of these fields is optional. Solutions by Lehman plans on adding a picture database of tree species in the near future.

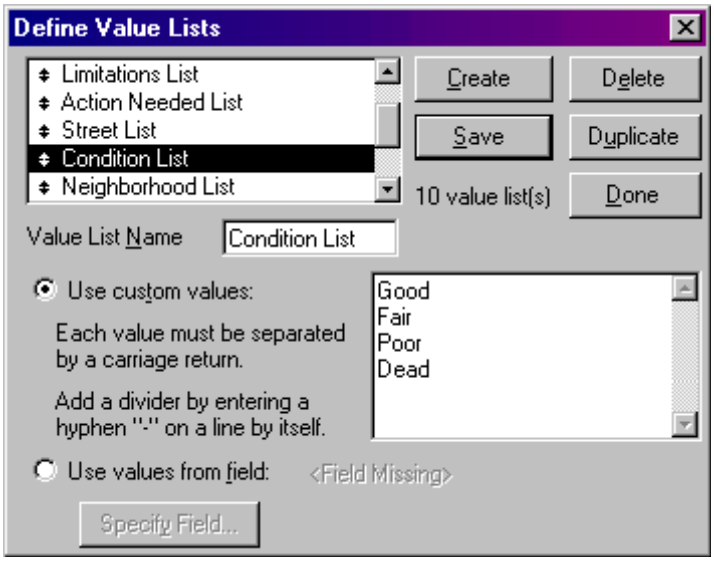


Figure 3.3.6: Value lists such as condition classes and street names are defined in one window.

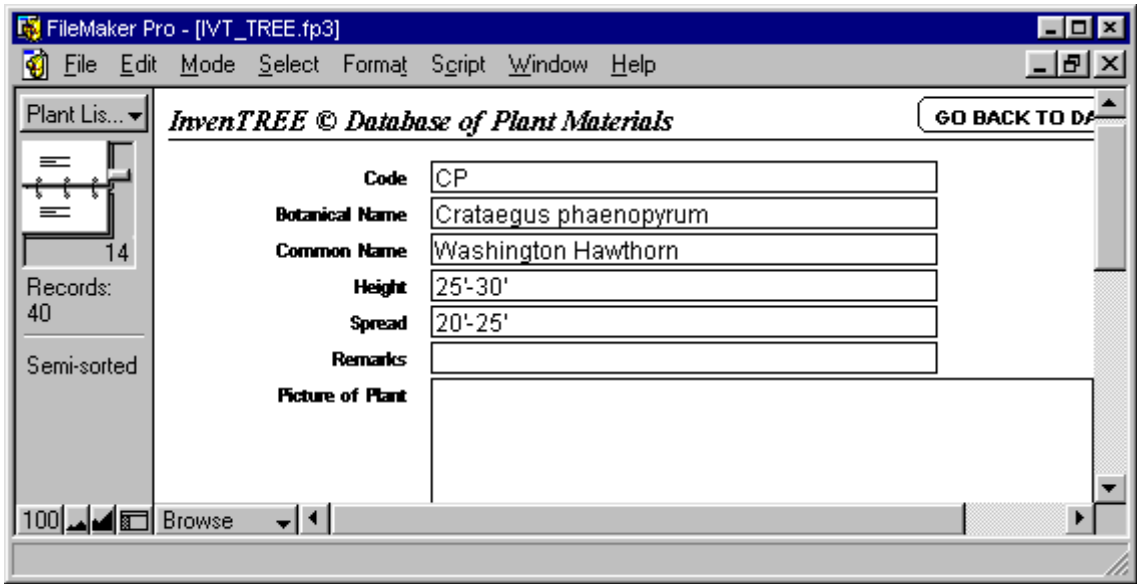
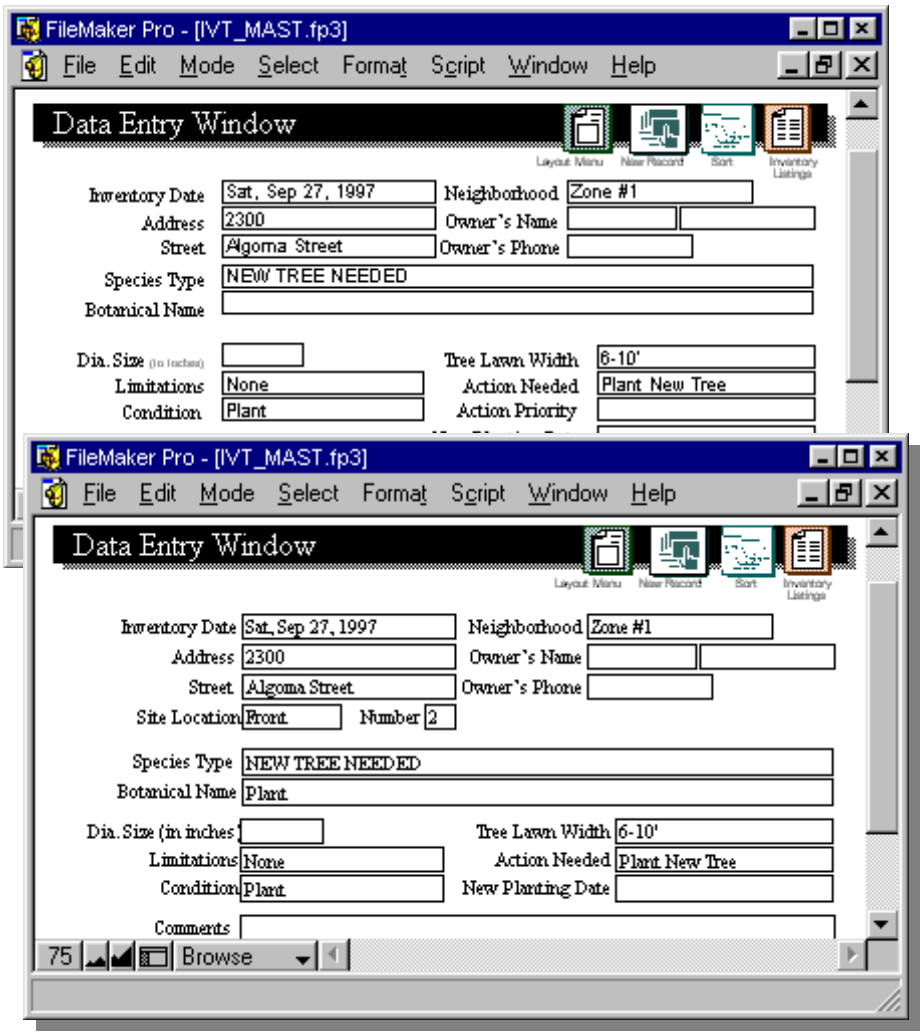


Figure 3.3.7: A code, botanical name, common name, height, and remarks can be entered for a tree species.

Changing layouts

The content and layout of screens can be customized by switching to the *layout* mode of FileMaker Pro. Fields can be moved, added, and deleted for any InvenTree screen. Field formats include *text*, *number*, *date*, and *time*, and *value lists* can be assigned to fields where needed. Text font, size, and color can be specified for each field, along with border color, line thickness, and background color. The tab sequence order that is used during data entry can be set for each field. Figure 3.3.8 indicates two **data entry** screens where the foreground screen contains added *site location* and *number* fields, and a deleted *action priority* field.



▲ *Figure 3.3.8: Screen content and layout can be customized by the user. The foreground screen indicates added site location and number fields, and a deleted action priority field.*

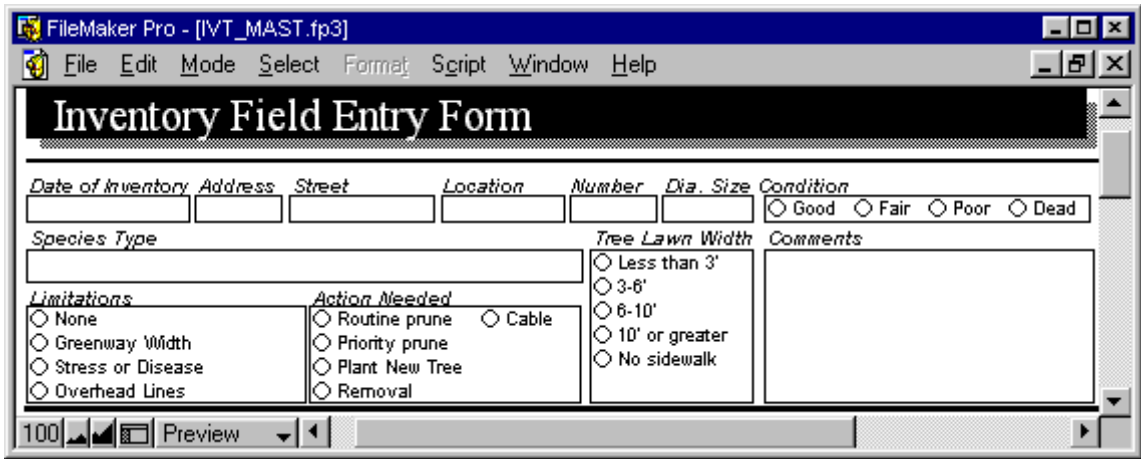


Figure 3.3.9: The inventory field entry form can be printed and used for data collection.

Data collection

InvenTree provides an **inventory field entry form** screen that can be printed and used for data collection (Figure 3.3.9). The design allows for fields for up to five tree sites to be printed on one page of letter-sized paper. Data fields are similar to those in the **data entry** screen described below (Figure 3.3.10).

Adding tree sites

Data are added, edited, and deleted via a keyboard in the **data entry** screen. Entering data into any field in this screen is optional. Drop-down lists in this screen are indicated in Figure 3.3.11.

Location descriptor fields used in our study with InvenTree include *neighborhood* (management area), *address*, *street*, *site location*, and site *number*. *Site location* and *number* fields were added to the layout by the authors. Drop-down lists are available for *neighborhood*, *street*, and *site location* fields.

Tree descriptor fields include *species type* (common name), *botanical name*, *diameter size*, and *condition*. Drop-down lists are available for *species type* and *condition* fields. *Botanical name* is entered automatically after selecting the *species type*.

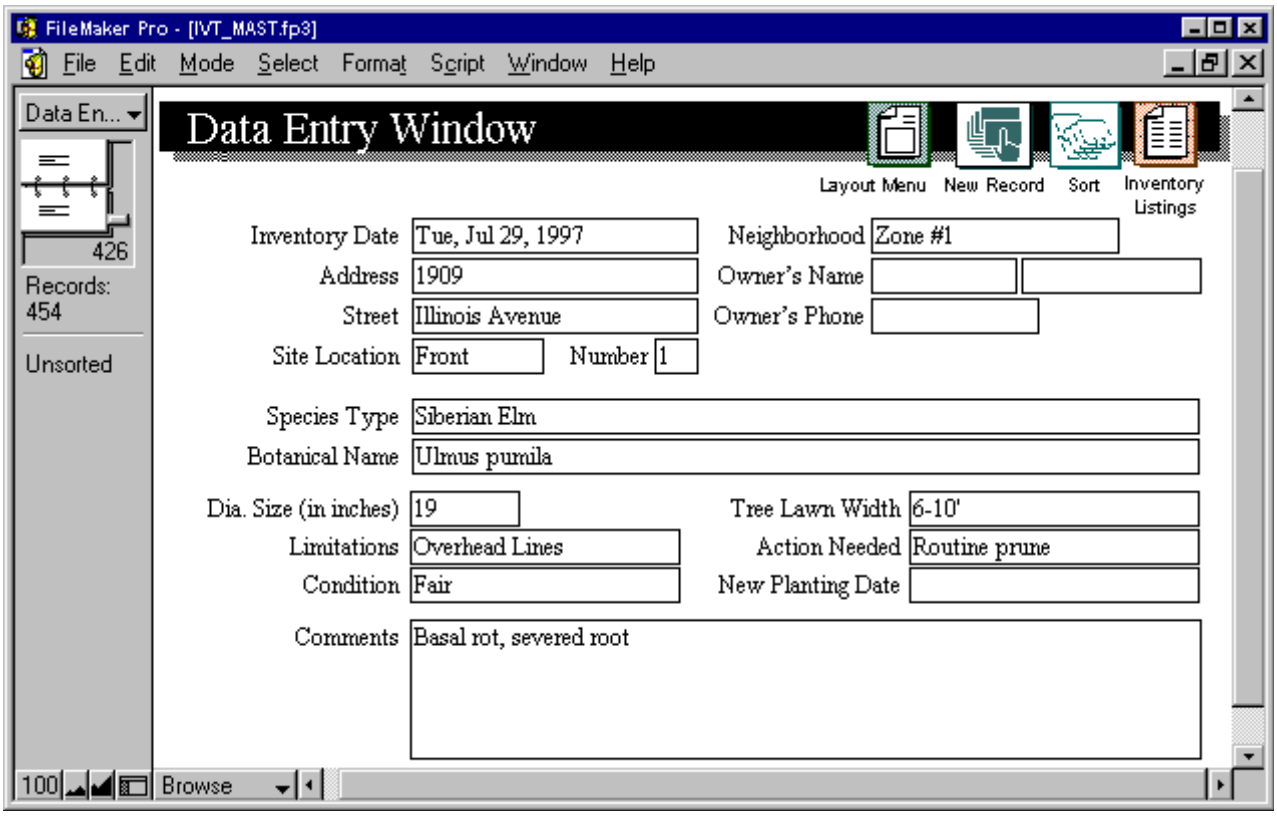
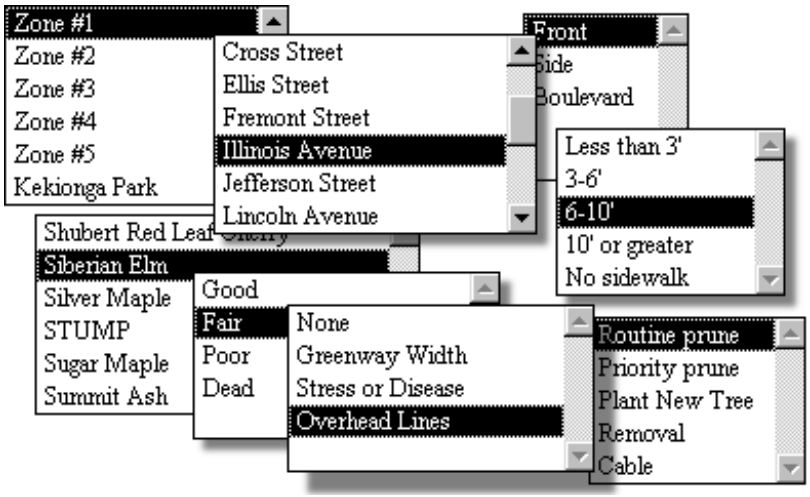


Figure 3.3.10: The data entry screen is used to add, edit, and delete tree site information.

Site descriptor fields include *limitations* and *tree lawn width*. *Limitations* include *overhead lines*, *stress or disease*, *greenway width*, and *none*. Drop-down lists are available for both of these fields.

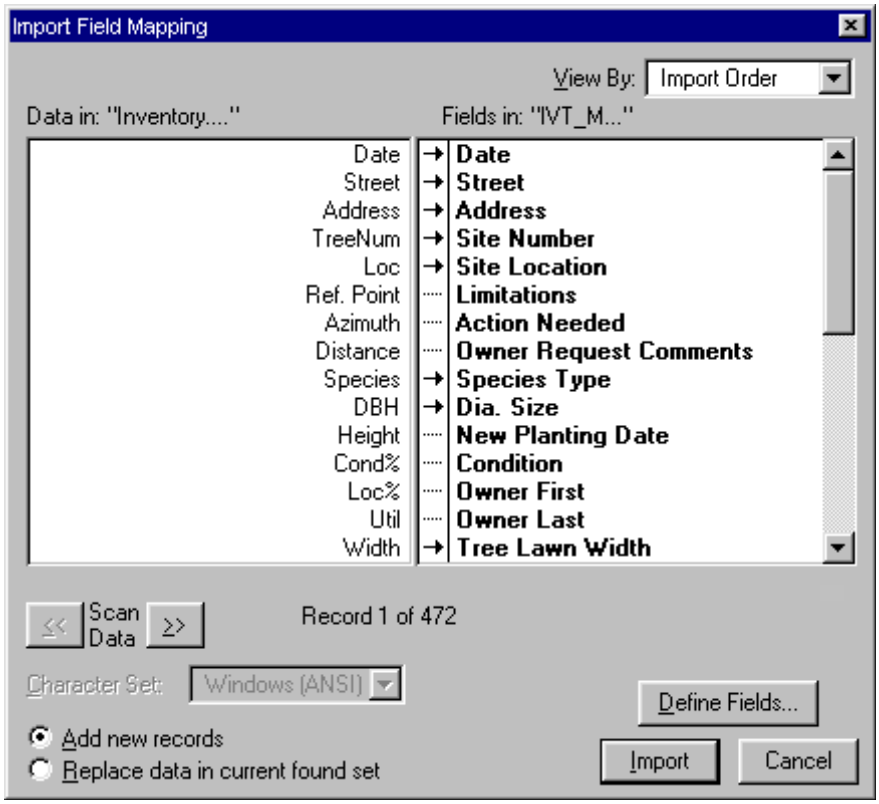
Additional fields include *inventory date*, *owner's name*, *owner's phone*, *action needed*, *new planting date*, and *comments*. The *inventory date* field automatically indicates the current date, although it can be changed by entering the desired date in the mm/dd/yy format. The *action needed* field is used for selecting a maintenance action from a drop-down list.



▲ *Figure 3.3.11: All drop-down list values can be customized by the user.*

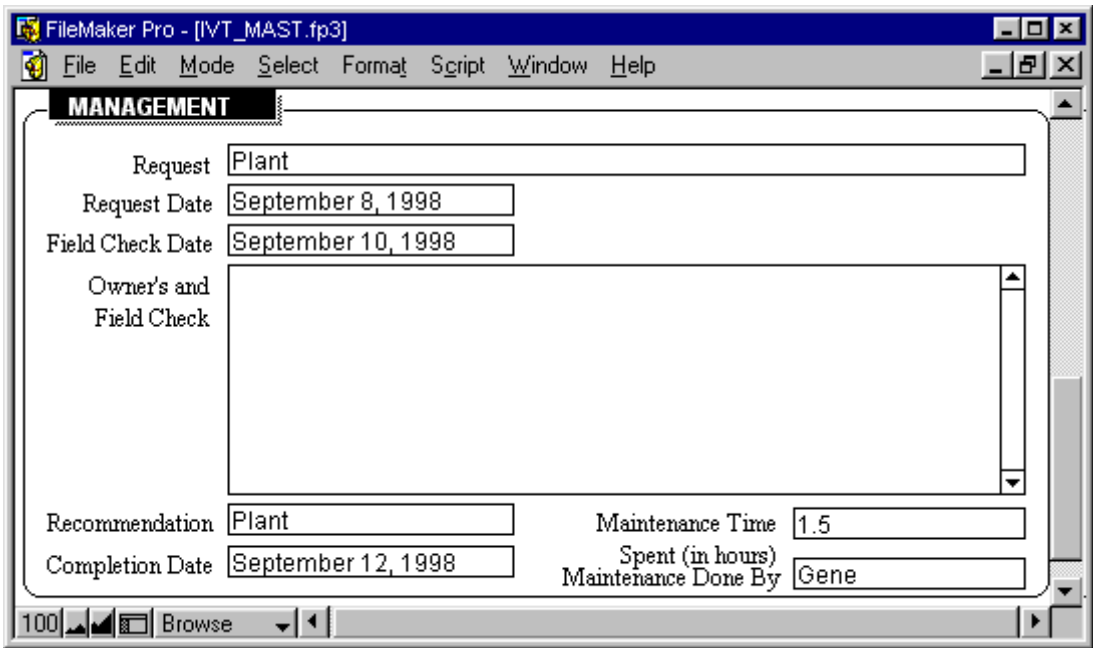
Importing data

FileMaker Pro allows for importing data including Dbase, Excel, Quattro Pro, and tab- and comma-delimited text files. The **import field mapping** window is used to match fields from the import source to the InvenTree database file (Figure 3.3.12). Unneeded fields from the import source file can be deselected from the list. Imported field format should match InvenTree field format in order to minimize editing after data are imported.



▲ *Figure 3.3.12: Fields from an Excel spreadsheet file (indicated on left) were matched with and then imported into the InvenTree database file (indicated on right). Unneeded fields from the import source file can be excluded.*

Figure 3.3.13: Maintenance information, including requests and completed work orders, is entered in the tree management screen.



Adding work information

The **tree management** screen is used to enter both work request and completed work information (Figure 3.3.13). The upper portion of the **tree management** screen contains inventory information for the tree site that can be edited if desired (not shown). Management information includes *request* action, *request date*, *field check date*, *recommendation* action, *completion date*, *maintenance time*, *maintenance done by*, and *owner's and field check* fields. The *owner's and field check* field allows for entering comments about the site or request from the owner and field check person. Drop-down lists are available for *request* and *recommendation* action fields. Both of these *value lists* contain *plant*, *trim*, *prune/shape*, *transplant*, and *remove* selections. These selections can be modified in the **define value lists** window (Figure 3.3.6).

Inventory listings

The **inventory listing** screen contains inventory information for tree sites indicated in a compact layout (Figure 3.3.14). Tree site data can be edited and printed from this screen.

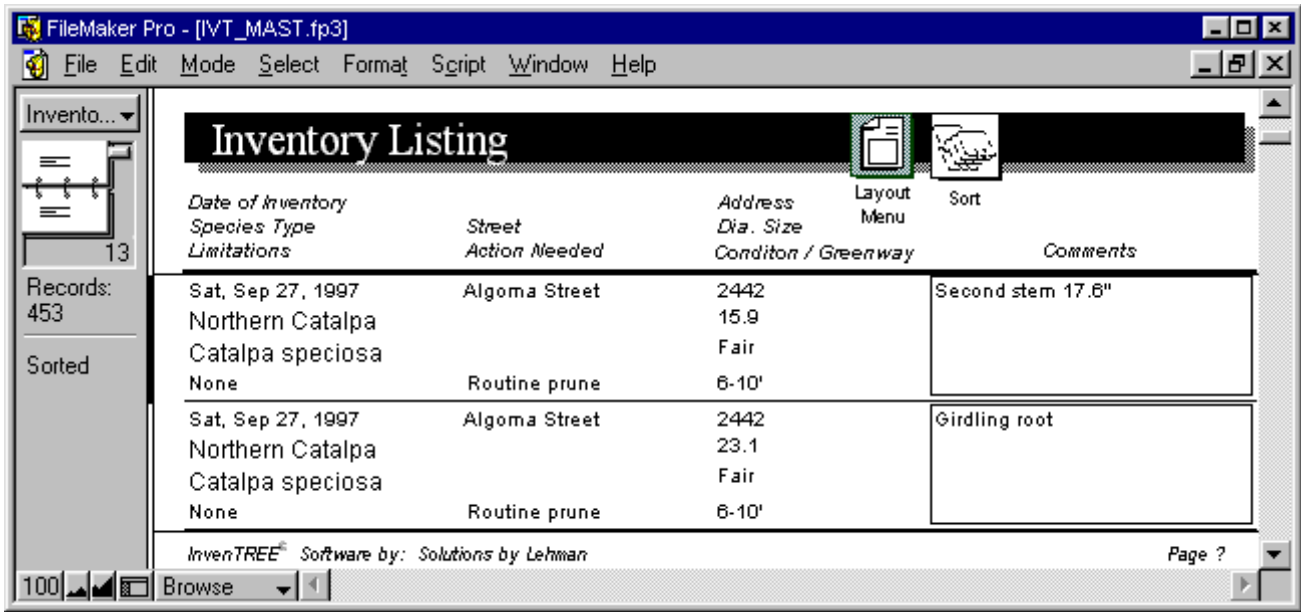


Figure 3.3.14: A listing of tree inventory information in a compact layout format is indicated in the inventory listing screen.

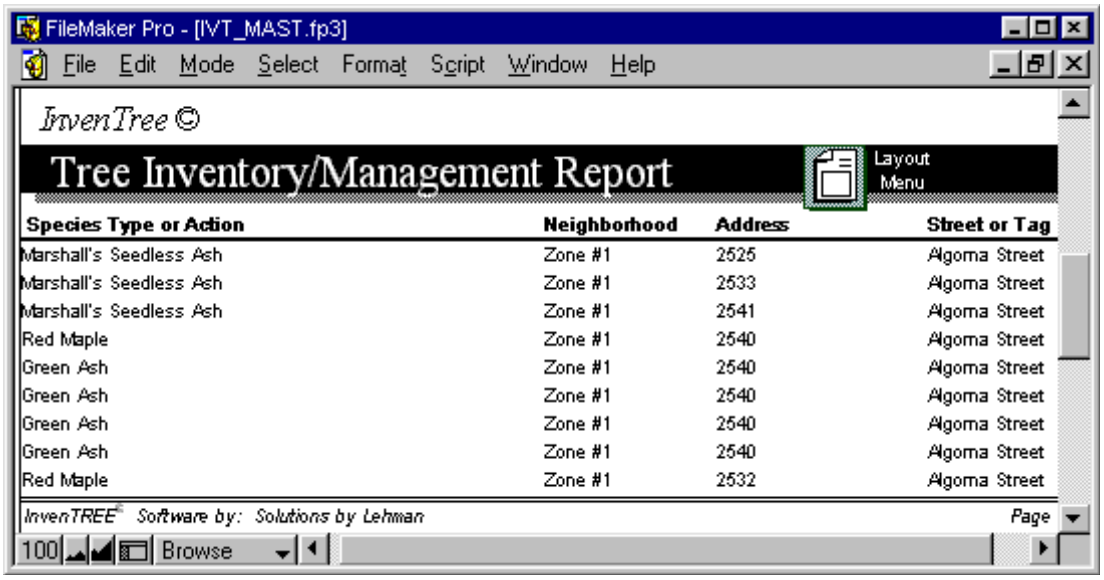


Figure 3.3.15: The tree inventory management report contains species, neighborhood, address, and street information. Fields can be edited in this screen.

Inventory management report

A list containing *species*, *neighborhood*, *address*, and *street* information is indicated in the **tree inventory management report** screen (Figure 3.3.15). Fields can be edited in this report, with drop-down lists available for *species*, *neighborhood*, and *street* fields. The **tree inventory management report** can be printed as it appears on screen.

Searching

The *find* command in FileMaker Pro is used to perform a search. A *find* can be performed using any InvenTree screen, including the **inventory field entry form** (Figure 3.3.9), **data entry** (Figure 3.3.10), **tree management** (Figure 3.3.13), **inventory listing** (Figure 3.3.14), and **tree inventory management report** (Figure 3.3.15) screens. The *find* criteria are entered into any one field or combination of fields by either typing in data or selecting values from drop-down lists. Boolean operators such as *less than* (<), *less than or equal to* (<=), and *greater than* (>) can be used in any field.

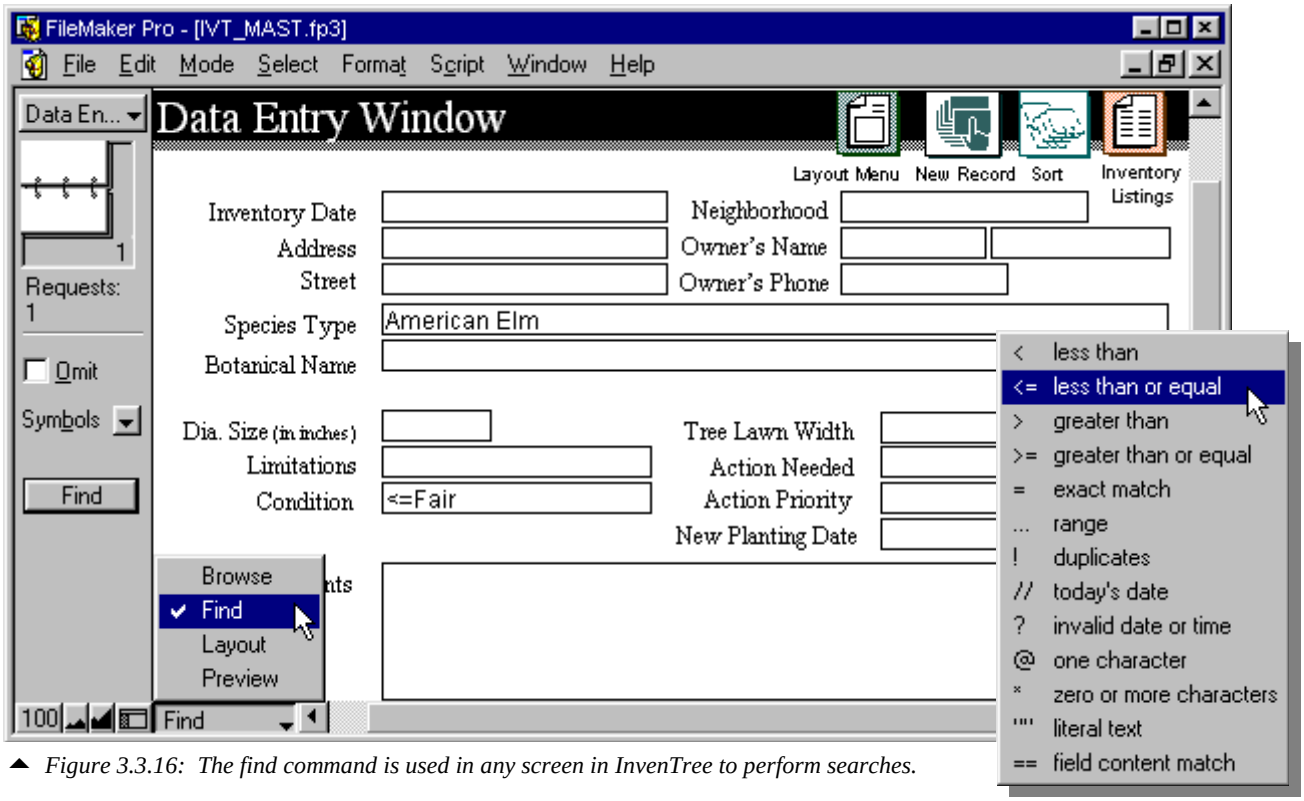


Figure 3.3.16: The find command is used in any screen in InvenTree to perform searches.