



# Lucid<sup>®</sup> Key Server

Online Player  
Help Documentation

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[www.lucidcentral.org](http://www.lucidcentral.org)

## Help for the Lucid Online Player

Welcome to the Lucid Online Player, one member of the Lucid family of products. For more information on other Lucid and related products, please visit the Lucidcentral website at [www.lucidcentral.org](http://www.lucidcentral.org)

The Lucid Online Player is a Web 2.0 cross-platform implementation of the Lucid3 Player, and will run on any JavaScript enabled web browser (such as Internet Explorer, Firefox, Safari, etc).

## Contents

Help for the Lucid Online Player .....	2
What does the Lucid Online Player do? .....	3
System Requirements .....	4
Supported Browsers.....	4
Using the Lucid Online Player .....	4
Features Available.....	4
Features Chosen .....	4
Entities Remaining .....	4
Entities Discarded .....	4
About Entities and Features.....	5
Collapsing and expanding tree items.....	5
Finding features, states and entities.....	5
Choosing states from multistate features .....	6
Choosing numeric features.....	6
Changing chosen states and features .....	6
Finding the Best feature - The Best function .....	7
Pruning the Feature Tree - The Prune Redundants function.....	7
Comparing entities - The Differences function .....	7
Why an entity was discarded - The Why Discarded function .....	8
Multimedia in the Lucid Online Player.....	8
Restarting a key.....	8
The Lucid Online Player Toolbar .....	9
About the Lucid Family of Products.....	10
About the Lucid3 Builder .....	10

## What does the Lucid Online Player do?

The Lucid Online Player is an effective and powerful identification and diagnostic tool. It is used to play interactive identification or diagnostic keys or guides created using the Lucid3 Builder.

Identification keys are usually created by an expert for a particular group of organisms or things (such as fruit flies, frogs, wildflowers, corals, grasses, crop diseases, or minerals etc). The key comprises a list of all the entities (e.g. species or other taxa, objects, diseases etc) in the group, a list of the features that may be used to identify them, and a matrix of scores of the entities for the features.

When a key is deployed in the Lucid Online Player, it can be used to identify specimens that belong to the group covered. Specimens are described by selecting, from the list of all features provided in the key, those features that match the specimen. At each step, the Lucid Online Player sorts the list of entities in the key into those that match the developing description and those that do not. As features are progressively chosen, the list of matching entities will be progressively reduced until a single entity (or perhaps a short list of entities) remains. The identification is complete.

Identifying the specimen – finding a name for it – is only the first step in finding out more about it. Links from the key's entities provide access to fact sheets and other information provided by the key builder. A name is also the starting point for finding information on an organism beyond the key, using the World Wide Web and other resources.

The Lucid Online Player provides other tools and information to help with the identification. For example, features in Lucid keys are usually provided with explanatory notes and images to help learn about them. Sub-sets of features can help organise the list of features to make it easier to manage, and the Player's Best function is a powerful tool to help decide which feature to address next.

View the topic *Using the Lucid Online Player*, for an introduction to the look and feel of the player.

## System Requirements

JavaScript enabled web browser. Internet/Intranet connection.

## Supported Browsers

Internet Explorer 5.0 and newer

Mozilla Firefox 2.0 and newer

Safari 2.0 and newer

Opera 7.0 and newer

## Using the Lucid Online Player

The Lucid Online Player has four main panels, a button bar. The four main panels display trees of features and entities.

### Features Available

*Features Available* shows the features and states in the key. An identification is performed by clicking on (and so ticking) score boxes alongside those states that match the specimen being identified.

In some keys, features and their states will be illustrated by images displayed next to the feature or state name. See the topic *Multimedia in the Lucid Online Player* for more information.

### Features Chosen

*Features Chosen* shows the features and states that have been used to describe the specimen being identified.

When an identification is started this window will be empty; as features are progressively selected in Features Available, they are copied to Features Chosen for handy reference.

To unchoose a previously chosen state, click on (and so un-tick) its score box in Features Chosen.

### Entities Remaining

*Entities Remaining* shows all entities that match the chosen features and states.

In some keys, entities will be illustrated by images and web pages displayed next to the entity name. In addition, a tab at the bottom of the Entities panels provides access to a gallery of images for all remaining entities. See the topic *Multimedia in the Lucid Online Player* for more information.

### Entities Discarded

*Entities Discarded* shows all entities that do not match the chosen features and states.

The button bar contains many options to help make an identification easier. See the topic *The Lucid Online Player Toolbar* for links to help on these.

## About Entities and Features

*Entities* in Lucid are the things the key aims to identify. Depending on the scope of the key, the entities may be different kinds of things. For example, in a key to the palms of Brazil, the entities will be species of palms, in a key to the families of flies of the world the entities will be fly families, in a key to minerals the entities will be types of minerals, in a key to disorders of sweet potatoes the entities will be the causes of disorders found in sweet potatoes. In Lucid we use the term entity because it applies to all the possible things that a key may be designed to help identify. Lucid itself doesn't know whether the entities are species of plants, families of flies, minerals or diseases – they are all simply entities to Lucid, and are all handled in the same way.

*Features* in Lucid are characteristics of the entities in the key that can be used to describe each entity.

- |                                       |  |
|---------------------------------------|--|
| <input type="checkbox"/> Crystal form | For example, in a key to minerals one feature may be the types of crystalline form shown by the mineral. Amongst the minerals in the key, there will be a number of different crystal forms – cubic, tetragonal etc. The different possibilities for crystal form are called states of the feature. States of a feature are indicated in the Lucid |
| <input type="checkbox"/> cubic        |  |
| <input type="checkbox"/> tetragonal   |  |
| <input type="checkbox"/> orthorhombic |  |

Online Player by scoring boxes preceding the state names.

In Lucid there are three main types of features.

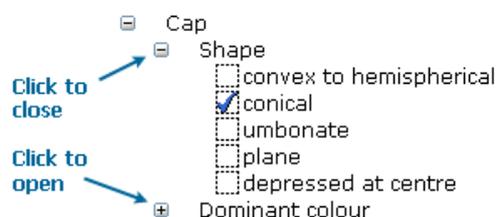
*Multi-state* features, like those shown for the crystal form of minerals, have two or more alternative states.

*Numeric* features, by contrast, are ones in which real numbers (integer or decimal) are used to describe the entities. *Numeric* features are normally used for lengths, widths, ratios and counts. For example, a key to butterflies may use a *Numeric* feature for the length of the forewing, or for the number of segments in the antennae.

*Grouping* features are features that contain other features as children.

## Collapsing and expanding tree items

In Lucid keys, features and entities can be arranged in hierarchical trees. Where this is the case, nodes of the tree are opened and closed using buttons to the left of each node:



Alternatively, the Collapse All and Open All buttons on the toolbar will collapse or open all nodes.

## Finding features, states and entities

To search for a feature or state, activate one of the Features panels by clicking within it, then click the Find button on the toolbar.

To search for an entity, activate one of the Entities panels by clicking within it, then click the Find button on the toolbar.

In the Find dialog, type the text to search for in the input field, and click the find button.

## Choosing states from multistate features

In Lucid, all states in Features Available are provided with checkboxes. Choose a state by clicking on its checkbox. Entities that match the chosen state will remain in Entities Remaining; entities that do not match will be moved to Entities Discarded. The chosen state will also be added to Features Chosen.

In Lucid keys, you may choose more than one state for any given feature. For instance, if a key has a feature Flower colour with states white, cream, yellow, red, and blue, you may be unsure whether to choose the states white or cream for your specimen. In this case, choose both states. In normal identification mode, Entities Remaining will list all entities with white or cream flowers.

## Choosing numeric features

For numeric features, you must enter a value rather than choose from a set of states. Length and width features, for example, may be treated in Lucid keys as numeric rather than multi-state features.

To enter details about a numeric feature, click its edit box. A dialog box will pop up into which you can type the appropriate value.

You can enter single values and ranges. Valid entries will be of the form:

- x (a single value)
- x-y (between x and y)
- <x (less than x)
- >y (greater than y)

It's good practice when using numeric features to enter a range rather than a single value if possible. For example, if a key to plants has a feature Leaf length, it's better to choose several typical leaves from your specimen and to enter the range of leaf lengths found over those leaves (ignoring unusually small or unusually large leaves) than to enter the length of a single leaf.

## Changing chosen states and features

Chosen states in the Lucid Online Player are checked with a tick in both Features Available and Features Chosen. To remove a previously chosen state, simply uncheck its checkbox in either list. Note that unchecked states remain in Features Chosen until the key is restarted - this allows them to be easily rechosen if necessary.

To change the value of a chosen numeric feature, click on its edit box in Features Chosen then change the values entered in the Numerics dialog box. To unchoose the feature completely, remove any values from the dialog box and click OK.

## Finding the Best feature - The Best function

Once one or more states have been chosen and the list of Entities Remaining has been reduced, some features may be more useful for the next step than others. For example, some features may be scored the same for all entities remaining, in which case choosing a state of that feature would not contribute to the identification.

The Lucid Online Player has a Find Best algorithm for determining which is the best feature to address at any stage during an identification session. In general, a feature that would, on average, cause the list of Entities Remaining to be halved is a good feature to address.

Find Best will determine which is the best feature to address next, and jump to and open that feature in Features Available. The Next Best and Previous Best buttons on the toolbar allow navigation through the features list, if the first feature nominated cannot be addressed.

To activate the Find Best function click the Best button on the toolbar.

If the list of entities in Entities Remaining changes after choosing a feature as suggested by Find Best, it may be worth clicking the Best button again to recalculate the next best feature to address.

## Pruning the Feature Tree - The Prune Redundants function

After a number of features have been chosen and the Entities Remaining list has been substantially reduced, some features and states may be redundant for the identification.

A state is considered redundant if it applies to none of the entities remaining, or to all of the entities remaining (choosing such a state will either leave no entities or remove no entities, so it is useless to answer). A feature is redundant if all of its states are redundant.

The Prune Redundants function will scan the features in Features Available and remove any redundant features and/or states for the remaining entities. This may be useful to “clean up” the list of features, to make it less likely that a choice will be useless.

*Note that there is one circumstance in which apparently redundant states may be left in after pruning. Consider a 2-state feature, one state of which would remove some remaining taxa, the other of which would remove none. The state that removes no taxa is not logically redundant in this case, and would not be removed since removing it would leave a character with only one state.*

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To activate the Prune Redundants function click the Prune button on the toolbar.

## Comparing entities - The Differences function

Suppose you have used the Lucid Online Player to try to identify a specimen, and at the end of the session several entities remain.

One way of trying to decide which of these is correct would be to access the information (photographs & fact sheets) associated with the entities. This may allow you to discriminate the entities further.

A better way may be to view a list of features that differ between the entities. You can access such a list by clicking the Differences button on the toolbar. These will open the Differences window.

The Differences window has two panels. The upper panel lists all features that differ (that is, are not scored the same) for the remaining entities. When you click on a specific feature, the lower panel shows how the entities are scored for the listed features.

Differences in the upper panel are sorted by their utility for separating the entities, therefore it is recommended you review the differences from the top down.

## Why an entity was discarded - The Why Discarded function

After choosing several states, entities which do not match the current selection are moved to the Entities Discarded window. To determine why an entity was discarded, select it from the Entities Discarded window then click on the Why Discarded button on the toolbar.

The Why Discarded dialog which opens displays the list of chosen features that do not match the selected entity. For each feature, the list of states that you selected from the feature are displayed, along with the list of states present for the entity in the key.

If an entity is discarded that you believe should still be present, the Why Discarded function allows you to quickly compare your selections with the features present for the entity in the key.

## Multimedia in the Lucid Online Player

Many Lucid keys provide images and web pages for features, states and entities, to help make an identification easier and more accurate and to provide extra information on the items in the key. For example, web pages and images attached to features and states may help you decide which state of a feature to choose, or provide background hints and tips on difficult features. Similarly, web pages and images attached to entities may provide descriptions and extra information on the entities in the key, both to add to the available information and to help you choose whether an identification is correct.

By default, items in the Features and Entities panels that have images attached will be preceded by an image icon, while items that have web pages attached will be preceded by a text icon. In the Feature panels where all states of a feature have images, the list of states are replaced with a tabular view of their thumbnails

To view a web page or image attached to an item click on it's icon or thumbnail.

## Restarting a key

At the end of an identification click the *Restart* button on the toolbar to restart the key for another identification. All features will be unchecked and the *Features Chosen* and *Entities Discarded* windows will be emptied.

## The Lucid Online Player Toolbar

-  Restart Key
-  Collapse
-  Expand
-  Find
-  Subsets
-  Best
-  Previous Best
-  Next Best
-  Prune Redundants
-  Differences
-  Why Discarded
-  Help

## About the Lucid Family of Products

The Lucid family of products comprises a series of programs to help build, deploy and use interactive, computer-based identification keys. Lucid keys may be used to identify a wide range of objects or entities, from plants and animals to diseases and rocks. Usually, an expert on a particular subject uses a Lucid program to build an identification or diagnostic key to the species or objects of interest to them – essentially capturing their expert knowledge in the Lucid key. The key can then be distributed, allowing other interested people to identify and learn about the things in the key.

The two main programs in the Lucid family are the Lucid Matrix and Lucid Phoenix systems. Lucid3 is the latest implementation of the Lucid Matrix system. Lucid Phoenix is used to convert existing dichotomous or branching keys printed in books or monographs into interactive keys or to create and deploy new pathway keys. In addition, the Lucid family includes a number of tools designed to support users of the Lucid3 and Lucid Phoenix systems. For more information on other members of the Lucid family of products, please visit the Lucidcentral website at [www.lucidcentral.org](http://www.lucidcentral.org).

## About the Lucid3 Builder

Lucid keys are created in the Lucid3 Builder. Using the Builder, an expert in a group of entities (plants, animals, diseases, minerals, archaeological artefacts etc) creates interactive, random-access keys that can be deployed over the Internet or CD.

The basic elements of a Lucid key are:

- a list of entities
- a list of features and states that may be used to describe those entities
- a matrix of score data for the features associated with each of the entities
- various attachments (images, web pages etc) for the entities and features, to provide extra information to users.

The Lucid3 Builder provides all the tools necessary to create the entity and feature lists, encode the score data, and attach information files to items.

For more information on the Lucid3 Builder, visit the Lucidcentral website at [www.lucidcentral.org](http://www.lucidcentral.org).