

PART C

NEW GREEN

**HANDBOOK FOR NEW GREEN DATABASE
OF WETLAND PLANTS
WITH ECONOMIC POTENTIAL**

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NEW GREEN BACKGROUND INFORMATION

1.1 INTRODUCTION AND SYSTEM REQUIREMENTS

The **new green** database of wetland plants with economic potential should be used in conjunction with the *Wetland Site Assessment Guidelines* to select potential wetland cultivation plants suited to the wetland site of interest.

The **new green** database has been created in Microsoft® (MS) Access. The database thus requires the user to have MS Access installed on the computer system. MS Access is a component program of the MS Office program package. The **new green** database is suitable for use with either MS Office 1997 or MS Office 2000. The system hardware requirements are those required for operating the relevant MS Office program package.

1.2 INTEGRATION OF NEW GREEN DATABASE AND WETLAND SITE ASSESSMENT GUIDELINES

The *Wetland Site Assessment Guidelines* refer to the **new green** database, and the two should be used together to provide decision support when enquiring into the feasibility of wetland cultivation. Whilst the *Wetland Site Assessment Guidelines* direct the user in the enquiry as to whether a particular wetland site may be suited for cultivating, the **new green** database provides the plant options for cultivation at the wetland site under consideration.

1.3 STRUCTURE OF NEW GREEN DATABASE

The user-friendly interface of the **new green** database (the main form) is designed to guide the user through the process of identifying species which may be suited to the particular wetland under consideration. The skeleton design of the **new green** database (Fig. 1) shows the four routes of database enquiry. The **new green** database main form (Fig. 2) presents the user with these four routes for accessing information on species suitable for cultivation in wetlands:

- Via the species name;
- Via the uses of the plant components;

- Via the geographic region;
- Via a site quiz of the characteristics of the potential cultivation site.

The four routes of enquiry on the main menu are structured to dovetail with the *Wetland Site Assessment Guidelines*, and will lead the user through a site- or species-assessment towards a choice of plants for cultivation.

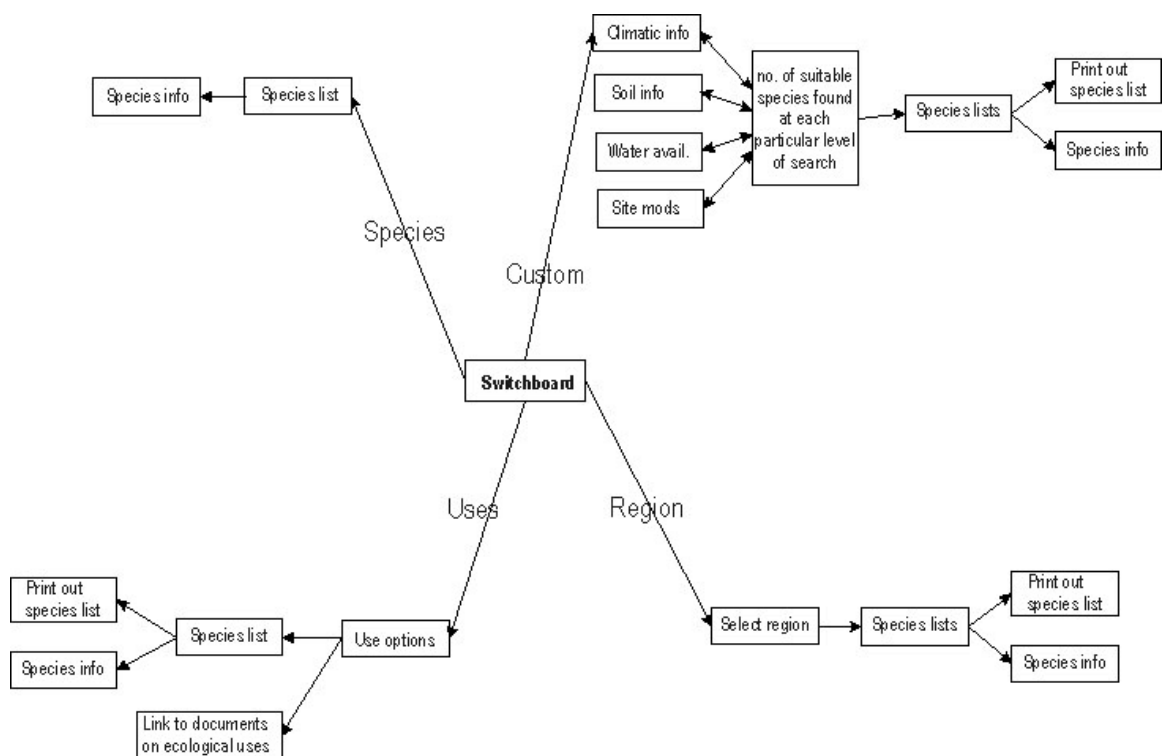


Figure 1 Skeleton design of the **new green** database starting at the main form



Figure 2 The **new green** database main form presents the user with four options for accessing information on wetland cultivation.

1.4 INFORMATION INCLUDED IN THE **NEW GREEN** DATABASE

Information on plants and their respective environmental preferences are the main components of the database.

Information is available about the following plant characteristics:

- Scientific and vernacular common names;
- Distribution by biome and province within South Africa;
- Plant growth form;
- Plant habitat;
- Plant climatic and soil preferences;
- Plant environmental tolerances;
- Plant uses;
- Cultivation and harvesting methods;
- Market values.

Data has been included in the various categories where available.

The database serves as a guideline to direct the user to potentially useful wetland plants. Non-wetland plants are not included in the database. While the database provides a limited amount of information about the individual species, it is emphasised that the user will need to make his/her own more detailed enquiry to find out all relevant information about cultivating, harvesting, and marketing criteria for the chosen species.

1.5 SPECIES INCLUDED IN THE **NEW GREEN** DATABASE

There are 38 species listed in the database. These are a mix of indigenous as well as non-invasive exotic species. Each species which has been included in the database was selected because it meets two criteria:

- the species is known to have a preference for wetlands or water-inundated areas such as the margin of dams and rivers; and
- the species has recognised uses and thus has a potential economic value.

Whether or not a species is suitable for cultivation is not a criterion for species' inclusion in the database. The possibility of cultivating a species will be a separate enquiry after the species has been identified through the database to be of potential use in a given wetland situation.

Cultivation potential will be related to an enquiry into the economic value and market demand for the species.

1.6 SPECIES NOT INCLUDED IN THE **new green** DATABASE

Although the database is predominantly composed of indigenous plants, a few exotic species are also included which are known to be non-invasive. However, exotic species of aquatic plants such as those used for the tropical aquarium market are not included in the database at this stage. These species were excluded due to concerns about their invasive potential.

1.7 RANGE OF SPECIES USES AVAILABLE

Table 1 summarises the species included in **new green**, listing their scientific and common names, indigenous or exotic status, and their categories of use.

Table 1 Summary of plant species included in **new green**

SPECIES NAME		STATUS	USES					
Genus species	English (or isizulu) common name	Indigenous (I) / Exotic (E)	Ornamental	Utilitarian	Essential oils	Medicinal	Food	Water purification
<i>Acorus calamus</i>	Sweet flag	E			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>Aponogeton distachyos</i>	Cape pondweed	I				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Artemisia afra</i>	African wormwood	I			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Colocasia esculenta</i>	Coco yam / taro potato	E					<input checked="" type="checkbox"/>	
<i>Crinum bulbispermum</i>	Orange River lily	I	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
<i>Crinum campanulatum</i>	Water crinum / vlei lily	I	<input checked="" type="checkbox"/>					
<i>Crinum macowanii</i>	River crinum	I	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
<i>Cyperus fastigiatus</i>		I		<input checked="" type="checkbox"/>				
<i>Cyperus latifolius</i>	(Ikhwane)	I		<input checked="" type="checkbox"/>				
<i>Cyperus marginatus</i>	(Incema)	I		<input checked="" type="checkbox"/>				
<i>Cyperus natalensis</i>	(Induli)	I		<input checked="" type="checkbox"/>				
<i>Cyperus papyrus</i>		I		<input checked="" type="checkbox"/>				
<i>Cyperus sexangularis</i>	(Imusi)	I		<input checked="" type="checkbox"/>				
<i>Cyperus textilis</i>	(Imusi)	I		<input checked="" type="checkbox"/>				
<i>Drimia robusta</i>		I				<input checked="" type="checkbox"/>		
<i>Gunnera perpensa</i>	River pumpkin	I				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>Hyphaene coriacea</i>	(Ilala)	I	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				

SPECIES NAME		STATUS	USES					
Genus species	English (or isizulu) common name	Indigenous (I) / Exotic (E)	Ornamental	Utilitarian	Essential oils	Medicinal	Food	Water purification
Juncus effusus		I		<input checked="" type="checkbox"/>				
Juncus kraussii	Salt marsh rush	I		<input checked="" type="checkbox"/>				
Miscanthus junceus	Wire leaf daba grass	I		<input checked="" type="checkbox"/>				
Nymphaea capensis		I	<input checked="" type="checkbox"/>					
Phragmites australis	Common reed	I	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Phragmites mauritanus	Lowveld reed	I		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Pteris vittata		E						<input checked="" type="checkbox"/>
Raphia australis	Kosi palm / raphia palm	I		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Salix mucronata	Cape willow	I				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Sansevieria hyacinthoides	Bowstring hemp	I	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Schizostylis coccinea	Scarlet river lily	I	<input checked="" type="checkbox"/>					
Schoenoplectus corymbosus	(Mxobosi)	I		<input checked="" type="checkbox"/>				
Schoenoplectus litoralis	(Induli)	I		<input checked="" type="checkbox"/>				
Scirpus sp.		I						<input checked="" type="checkbox"/>
Spirulina sp.		I				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Typha capensis	Bulrush	I		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Vetiveria nigratana	Vetiver grass	E	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vetiveria zizanioides	Vetiver grass	E	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wachendorfia thyrsiflora	Blood root	I	<input checked="" type="checkbox"/>					
Zantedeschia aethiopica	Arum lily	I	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
Zantedeschia albomaculata	Spotted-leaf arum lily	I	<input checked="" type="checkbox"/>					

1.8 ECONOMIC VALUE OF SPECIES

Where possible, the market values of the plants have been included in the database. However, many of the indigenous species have not yet been grown commercially, and there is no reliable source of information about market values in many cases. Furthermore, plants grow in specific habitats and geographic areas, and some tend to be perceived a ‘free’ resource, available to anyone who makes the effort to search them out and harvest them. Thus the actual street or market value of a plant depends to a large extent on the scarcity of the plant and on the distance between the market and the plant habitat. It follows that the market value can vary widely from place to place.

Added to this variability is the variability in demand, partly because many of the uses of plants are still tied to cultural practices and knowledge, both of which vary from place to place. Accordingly, a plant may be in great demand in one place but of little value in another place. This variability can make it a risky enterprise to cultivate plants for traditional uses.

A third variable results when cultivators of useful plants end up competing with others who are harvesting the ‘free’ plants from the wild. The harvesters will generally be able to charge lower prices than the cultivators (in the short term), creating substantial risks for the cultivators as a result of downward pressure on the market price.

For all of these reasons, it is not possible to determine a reliable general market value for a particular useful plant product, and the database accordingly does not do so except in a few instances where reliable information has been published. Furthermore, in the light of the above discussion the market values given in the database should be viewed as rough guides only.

As regards the cost of cultivating a particular plant, most of the species in the database have not been formally cultivated except perhaps on a very small scale, and the cost of cultivation is therefore not known.

Cultivation of indigenous plants for traditional uses is not an easy way to make a living, and this cautionary note should be kept in mind in all cases of indigenous plant cultivation. Given all the variables mentioned above, it is advisable that any cultivation project should start as a low-key trial during which cultivation methods and costs, product requirements, market values, and other factors are investigated.

1.9 DATABASE UPDATES

A unique feature of the database is that users can update it with information of their own, making it into a customizable database. Using MS Access allows the database to be shared and to be updateable by multiple users, either through the internet or by allowing for all the individually-modified databases to be incorporated into the master database. The database replication function is used to make special copies — called replicas — of a database so that users at different locations can all work on their own copies at the same time and share, or synchronize, their changes. In these ways, the master copy is able to reflect the cumulative input of many separate users, and in turn the separate inputs can be shared by the many users. In other words, each user gets to share the updated information provided by many separate users.

The corollary of this multi-user updateability is that the database can continually become more comprehensive. Users with different specialisation will tend to make their best contributions from within their speciality area. In this way the database makes the best use of the best available experience and information from many users.

However, the downside of this is that the on-site modifications may go unnoticed by the collective users. In order to remedy this, it may be useful to create a centralized database which is updated with the information of all known users. In this way a comprehensive database will develop which makes use of the individual expertise and experience of many users. An updated version can be provided annually at a reasonable fee to the users.

1.10 SOURCES OF INFORMATION USED FOR NEW GREEN DATABASE

The new green database has been populated with data from books, other databases and personal communications. Other databases used were NURSERY (Prof. JF de Wet, PE, South Africa) and Plants for a Future (Registered Charity Number 1057719, England). All information sources are acknowledged in the database, and references are listed in the database.

2

NEW GREEN USER MANUAL

Introduction

Welcome to `new green`, the database of developing green crops!

This user manual will guide you through `new green`, showing you how to maximise your search for information.

Conventions in this Manual

- Words indicated in ***bold italic*** are contained in the Glossary.
- Words indicated in `fixed sys` represent information typed into the computer
- `new green` command buttons are represented as: Button
- Titles of forms are in *CAPITAL ITALICS*

SECTION A USING AND UNDERSTANDING THE **NEW GREEN** INTERFACE

A.1 HOW TO OPEN **NEW GREEN**

The **new green** program cannot be run directly from the CD; you must first move all the contents of the CD into your hard drive.

A.1.1 Prepare the files for first use (installation)

- 1) Place your CD in the CD drive and close the drive.
- 2) Open Windows Explorer.
- 3) Locate the **X:\NewGreen** folder (where X indicates the drive designation of your CD drive).
- 4) Drag and drop this **X:\NewGreen** folder onto the root folder of your **C:** hard drive.

Everything from the CD should now be installed on your hard drive, with the following files in their corresponding folders:

C:\NewGreen\readme.txt

C:\NewGreen\Data\NGdata.mdb

C:\NewGreen\forOffice97\NGcode97.mdb

C:\NewGreen\forOffice2000\NGcode2000.mdb

C:\NewGreen\UserManual\new green user manual.doc

However, the files will all be in a “read-only” state, and this must be changed for **each** file:

- 1) right-click on the file
- 2) select **Properties**
- 3) in the General tab of the properties window, un-check the **Read-only** attribute
- 4) click **Apply**, then click **Close**

A.1.2 Start the **new green** Program

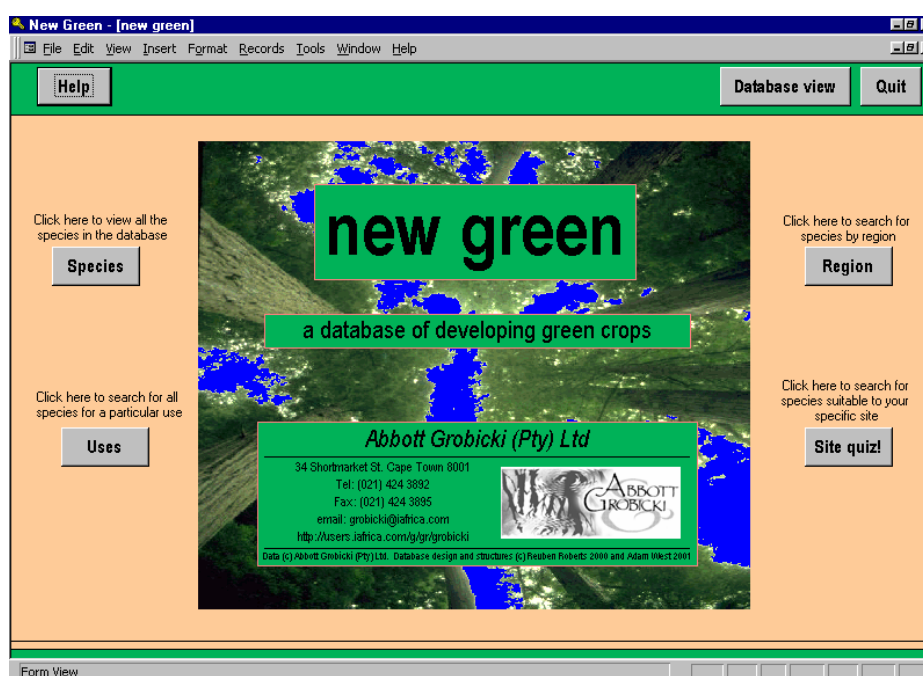
To start **new green**, you have to **Open** the code file designed for the version of Microsoft Access® which is installed on your PC.

If you are using Microsoft Access® v 8 (which comes with Office 97 professional) then open the code file **NGcode97.mdb**

If you are using Microsoft Access® v 9 (which comes with Office 2000 professional) then open the code file **NGcode2000.mdb**

new green will open in Microsoft Access. Wait until the loading is complete. Your screen should look like Figure A-1.2. **new green** is now open and ready for use.

Figure A1.2-1: A successful start-up – The *MAIN* form of **new green**



A.2 HOW TO VIEW INFORMATION IN new green

All the data in **new green** are stored in sets of inter-linked spreadsheet tables. You, the user, primarily have access to these data through the **graphical interface**. This graphical interface, which opens automatically, consists of a series of pages called “**forms**” and simply provides a clear way of viewing and searching the data.

On every Form, there are several **command buttons**. It is strongly recommended that users use these command buttons to navigate between the forms of the graphical interface rather than opening forms from the **database window** and closing forms using the close window button (X). The command buttons have a functionality (e.g. updating records, checking indices, closing relevant forms, passing parameters etc.) that generalised menu buttons do not have.

new green has several **pre-programmed functions** to aid you in your search for useful information. These functions are all accessed by clicking command buttons on the **MAIN** form of the graphical interface. These functions are discussed in detail in “SECTION B: Functions in **new green**”.

There is **Help** available on most forms which explains the outcome of clicking each command button on the form.

Figure A2-2: The MAIN form from the graphical interface showing Command Buttons which should be used to navigate through new green







Should you wish to view the tables directly, or modify aspects of the database, you can click **Database view** on the **MAIN** form. The database window will then open and the graphical interface will close. **NOTE: This is NOT recommended for users not familiar with MS Access!** Modification of objects in the database could corrupt the database! For experienced

users who wish to use the database window, please refer to “SECTION C: Advanced Users Guide”.

A.3 HOW TO PRINT OUT INFORMATION FROM new green

In database terminology, any printed information generated by the database is called a “*report*”.

When the user creates a report in new green by clicking  **Print**, a report preview window opens. In this window the user can preview the report created before printing it out. To print the report from this window, click the print button on the toolbar () or select “ Print” from the File Menu. To return to the new green graphical interface, the user must click the close button on the tool bar ( **Close**).

A.3.1 Types of reports in new green

There are two main types of reports that can be generated in new green, information reports and species-list reports.

Information reports can be generated from the *SPECIES* form and the *SITES* form. In these reports, all the information pertaining to the selected species or site is printed out in a single report.

Species-list reports can be generated from the pre-programmed functions (see Section B for more details). These reports provide a list of suitable species based on information the user supplied or selected. These reports are primarily intended to be used as reference material for consulting the *SPECIES* form.

Section B FUNCTIONS IN **new green**

new green has several pre-programmed functions to aid you in your search for useful information. These functions are all accessed by clicking command buttons on the *MAIN* form, or *EXTENDED OPTIONS* form of the graphical interface. We will discuss each of these functions in turn.

B.1 STANDARD BUTTONS USED IN **new green** FUNCTIONS:

All functions use the following standard buttons.

Submit – performs the search based on the criteria entered by the user

Clear – clears all the search results and the criteria on that form

Back – steps back to the previous form

Print list – generates a report preview of the search results or species information that can be printed out.

Print – on the *SPECIES* and *SITES* form, this generates a report preview of the species information

View details – shows all the details of the searched species in a form similar to the *SPECIES* form

Only in the SiteQuiz:

Use ONLY these criteria – acts the same as **Submit**. It performs the search for species based on the criteria entered on that form only (i.e. no previous criteria are included).

Use ALL search criteria – acts the same as **Submit**. It performs the search for species based on the all criteria entered in the SiteQuiz so far.

Continue – moves to the next form in the SiteQuiz.

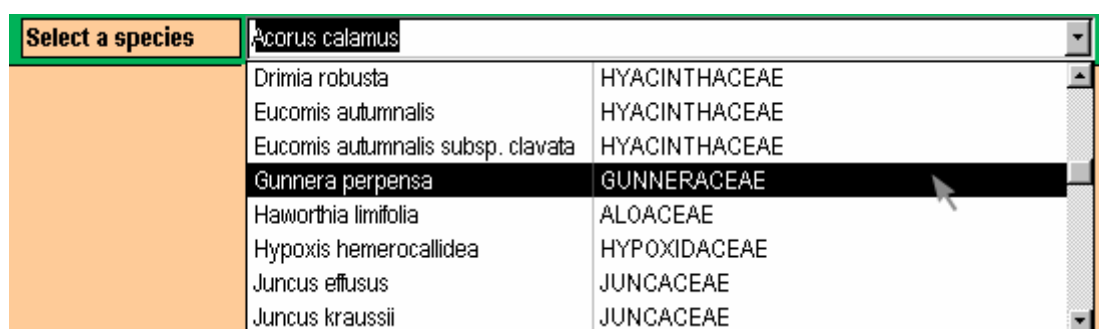
B.2 MAIN FORM FUNCTIONS



B.2.1 Species

This function opens the *SPECIES* form. In this form the user can select any species in the database and view all of the information on that species. In order to see any information, the user must click on a species in the “Select a species” drop-down box.

Figure B2.1-1: Clicking on a species in the “Select a species” drop-down box



Once a species is selected, the information for that species becomes visible. The information is contained on several pages accessed by **Tab Controls** found just below the “Select a species” drop-down box. By clicking on the tab controls, the user can view the information contained on each of these pages.

In order to print out all the information for the selected species, click **Print**.

B.2.2 Uses

This opens the *CUSTOM SELECTION OF USES* form. On this form the user can select any number of plant uses from the list provided. Once a selection has been made, clicking [Submit](#) creates a species list of plants corresponding to those uses. This list can then be printed out for reference (click [Print](#)), or the details of the plants viewed in the *SPECIES* Form (click [View details](#)).

Tips for selecting uses: Click once on a use to select it. Selection is indicated by the item being highlighted. To deselect a use, click the item again, the highlighting will disappear. To clear all selections click [Clear](#).

There are also some links to informative documents at the bottom of the form. Clicking these command buttons will open the relevant documents in Microsoft Word, where they can be printed out.

B.2.3 Region

This opens the *CUSTOM SELECTION OF REGION* form. On this form the user can select any number of regions in South Africa from the list provided. Once a selection has been made, clicking [Submit](#) creates a species list of plants corresponding to those regions. This list can then be printed out for reference (click [Print](#)), or the details of the plants can be viewed in the *SPECIES* form (click [View details](#)).

Tips for selecting regions: Click once on a region to select it. Selection is indicated by the item being highlighted. To deselect a region, click the item again, the highlighting will disappear. To clear all selections click [Clear](#).

B.2.4 SiteQuiz

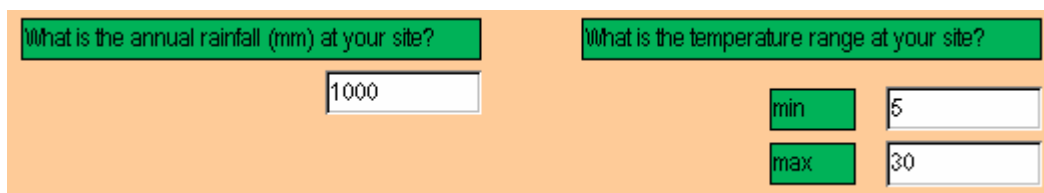
This opens the SiteQuiz Wizard, starting with the *SITE QUIZ: CLIMATIC LIMITS* form.

The SiteQuiz Wizard is designed to help the user find suitable species for his/her site. The SiteQuiz Wizard consists of a series of forms that asks the user for information about his/her site. Each time new information is submitted by the user it is added to the previous search criteria and the search is narrowed. At every stage of the SiteQuiz, the user can see how many species in the database are suitable for his/her site and may choose to view or print out those species. Please note: careful interpretation of the SiteQuiz search results is required (see “Interpreting search results” below).

Interpreting search results

For all of the searches in the SiteQuiz, any ***null values*** have been included into the search ***parameters***. Including null values into the search parameters gives the user much more flexibility in viewing potentially suitable species. Species that might otherwise have been excluded due to a null value in a key criterion, are now returned. These ***“null-searched” species*** are easily identifiable as they have blanks in the specific criteria for which they have no information. It is up to the user to determine whether or not these “null-searched” species are suitable for the site in mind.

For example - The user enters values for rainfall and temperature limits on the first SiteQuiz form:



The screenshot shows a form with two main sections. The first section, titled 'What is the annual rainfall (mm) at your site?', has a text input field containing the number '1000'. The second section, titled 'What is the temperature range at your site?', contains two sub-sections: 'min' with a text input field containing '5', and 'max' with a text input field containing '30'.

On clicking [Submit](#), species are returned by two pathways:

- 1) all species that fall within the climatic limits specified above are returned.
- 2) any species in the database for which rainfall and temperature limits have not been entered are also returned.

The Site Quiz: Step-by-Step

Tips for successful searching:

When asked for values, only type in numbers, units are not required (i.e. if your average annual Rainfall is 800 mm, enter 800, not 800mm, in the rainfall box)

You do not have to enter information for all of the criteria. If you leave a field blank, the SiteQuiz will simply ignore that criterion.

Step 1 Site Quiz: *Climatic Limits*

Overview

This form asks the user to enter the average annual rainfall (in mm) and temperature limits (in °C) for the site in mind. The user types in the relevant information and the clicks [Submit](#) to view the search results. The user can generate a report of the search results (click [Print list](#)) or can view all the details of searched species listed (click [View details](#)). To continue to the next form in the SiteQuiz, click [Continue](#). The search criteria will be passed on to the *SITE QUIZ: SOIL INFORMATION* form and will be shown at the bottom of this form. If the user wishes to skip this form in the SiteQuiz he/she can click [Continue](#) without entering any criteria.

Tips for successful searching:

- ♦ only type in numbers, units are not required (i.e. if your average annual Rainfall is 800 mm, enter 800, not 800mm, in the rainfall box)
- ♦ you do not have to enter information for all of the criteria. If you leave a field blank, the SiteQuiz will simply ignore that criterion

- ♦ if you click without entering any criteria, all the species in the database will be returned
- ♦ Note: the user-defined criteria are used to exclude species that are not suitable from the search results. Thus, when entering climatic information, the user should be wary of entering extreme recorded values. Rather, annual or 5-year averages should be used so as to include as many potential species as possible in the search results

Specific search logic

On this form, species are returned that have:

- ♦ a minimum rainfall requirement **less than** the *user-defined* rainfall value **AND**
- ♦ a maximum rainfall requirement **greater than** the user-defined rainfall value **AND**
- ♦ a minimum tolerated temperature **less than** the user-defined minimum site temperature **AND**
- ♦ a maximum tolerated temperature **greater than** the user-defined maximum site temperature **AND**

Algorithm = ([RainfallMin] <= User(Rainfall) **OR** Is Null)

AND ([RainfallMax] >= User(Rainfall) **OR** Is Null)

AND ([TempMin] <= User(minimum Temperature) **OR** Is Null)

AND ([TempMax] >= User(maximum Temperature) **OR** Is Null)

Note: for all algorithms the variable “User(description)” is the user-defined value or selection entered on the form.

Step 2 Site Quiz: Soil Information

Overview

This is the second form in the SiteQuiz. On this form, the user is asked to enter the average soil pH and all the soil textures that are found in the site in mind. The procedure is exactly the same for this form as for the *SITE QUIZ: CLIMATIC INFORMATION* form except has been replaced by and .

– performs the search for species based on the criteria entered on that form only (i.e. no Climatic Information criteria are included). Thus, the user is able to generate a list based on the soil information alone.

–performs the search for species based on the Climatic Information and the Soil Information.

To skip this form of the SiteQuiz, simply click [Continue](#).

Tips for successful searching:

- ◆ you do not have to enter information for all of the criteria. If you leave a field blank, the SiteQuiz will simply ignore that criterion
- ◆ if you click [Use ALL search criteria](#) without entering any criteria, all the species from the previous Climatic Information search will be returned

Specific search logic

If you click [Use ONLY these criteria](#) species are returned that have:

- ◆ a minimum tolerated soil pH **less than** the user-defined minimum pH **AND**
- ◆ a maximum tolerated soil pH **greater than** the user-defined maximum pH **AND**
- ◆ soil textures in common with the *user-defined* soil textures

Algorithm = ([Soil pH Min] <= User(Soil pH) **OR** Is Null)

AND ([Soil pH Max] >= User(Soil pH) **OR** Is Null)

AND ([Soil textures] = User(Textures) **OR** [All Soil textures] Is Null)

If you click [Use ALL search criteria](#) species are returned that have:

- ◆ been returned by the previous search **AND**
- ◆ a minimum tolerated soil pH **less than** the user-defined minimum pH **AND**
- ◆ a maximum tolerated soil pH **greater than** the user-defined maximum pH **AND**
- ◆ soil textures in common with the *user-defined* soil textures

Step 3 Site Quiz: *Water Availability*

Overview

This is the third form in the SiteQuiz. On this form, the user is asked to select the type/s of habitat in terms of water availability found in the site in mind. The water availability criterion is used to eliminate species from the search results that have higher water requirements than exist on the site.

The procedure for this form is exactly the same as for the *SITE QUIZ: SOIL INFORMATION* form. To skip this form of the SiteQuiz, simply click .

Tips for successful searching:

- ◆ it is important to select all the types of water availability that occur on your site, and not just the predominant one.
- ◆ if you click without entering any criteria, all the species from the previous two searches will be returned

Specific search logic

If you click species are returned that have:

- ◆ water requirements in common with the user-defined water availability

Algorithm = ([Water Requirements] = User(Water Requirements) **OR** Is Null)

If you click species are returned that have:

- ◆ been returned by the previous searches **AND**
- ◆ water requirements in common with the user-defined water availability

Step 4 Site Quiz: *Site Modifications*

Overview

This is the last form in the SiteQuiz. On this form, the user is asked:

Are you able to modify your site through excavation or the construction of dams?

Are you able to irrigate you site with ground water, river water or runoff water?

If the answer to either of these questions is “Yes” then the user should click next to the relevant question. The user can then enter information in the boxes that become visible.

Site Modifications:

If the user clicks , the Modifications box appears. This box is similar to the Water Availability box on the previous form. The user should select the options that will reflect the **new** situation on the site, **after** the modifications. Note: if is now clicked, the selections in the Modification box will replace the selections of the Water Availability box.

Irrigation:

If the user clicks ☐ Yes, the Irrigation box appears. The user should enter the amount of water that can be added to the site, exclusive of rainfall. The amount of irrigated water is then added to the amount of rainfall entered on the first SiteQuiz form. This new “Total water” amount is then used to search the database in the same manner Rainfall was used in the first site.

Tips for successful searching:

- ◆ it is important to select all the types of water availability that will occur on your site. The criteria selected in this box replace those selected in the *SITE QUIZ: WATER AVAILABILITY* form
- ◆ for the irrigation input: only type in numbers, units are not required (i.e. if your irrigation input is 1200 mm, enter 1200, not 1200mm, in the Irrigation box)
- ◆ if you click ☐ Use ALL search criteria without entering any criteria, all the species from the previous two searches will be returned

Specific search logic

If you click ☐ Use ONLY these criteria species are returned that have:

- ◆ water requirements in common with the user-defined site modifications **AND**
- ◆ a minimum rainfall requirement **less than** the new total water value **AND**
- ◆ a maximum rainfall requirement **greater than** the new total water **AND**

Algorithm = $([\text{RainfallMin}] \leq [\text{User(Rainfall)} + \text{User(Irrigation)}]) \text{ OR Is Null}$

AND $([\text{RainfallMax}] \geq [\text{User(Rainfall)} + \text{User(Irrigation)}]) \text{ OR Is Null}$

AND $([\text{Water Requirements}] = \text{User(Modifications)}) \text{ OR Is Null}$

If you click ☐ Use ALL search criteria species are returned that have:

- ◆ a minimum rainfall requirement **less than** the new total water value **AND**
- ◆ a maximum rainfall requirement **greater than** the new total water **AND**
- ◆ been returned by the temperature criteria of the Climatic Information search **AND**
- ◆ been returned by the Soil Information search **AND**
- ◆ water requirements in common with the user-defined site modifications

Algorithm = ([RainfallMin] <= [User(Rainfall) + User(Irrigation)] **OR** Is Null)
 Null)
AND ([RainfallMax] >= [User(Rainfall) + User(Irrigation)]**OR** Is Null)
AND ([TempMin] <= User(minimum Temperature) **OR** Is Null)
AND ([TempMax] >= User(maximum Temperature) **OR** Is Null)
AND ([Soil pH Min] <= User(Soil pH) **OR** Is Null)
AND ([Soil pH Max] >= User(Soil pH) **OR** Is Null)
AND ([Soil textures] = User(Textures) **OR** [All Soil textures] Is Null)
AND ([Water Requirements] = User(Modifications) **OR** Is Null)

Step 5 Site Quiz: Conclusion

You have finished the SiteQuiz. Click Return to Main Menu to end the SiteQuiz and return to the *MAIN* form.

B.2.5 Extended Options

This opens the EXTENDED OPTIONS form, which looks similar to the MAIN form, and operates in exactly the same way. A detailed description of these functions is provided in “Section B-2: Extended options functions”.

B.3 EXTENDED OPTIONS FUNCTIONS



B.3.1 Sites

This opens the *SITES* form. On this form the user can view information pertaining to specific site locations. The sites are linked to the species that occur in that site and to any relevant references. These can be viewed by using the tab controls positioned below the “Select a Site” drop-down box. To view the details of either a linked species or reference, highlight the relevant item and click **View**. Either the *SPECIES* form or the *REFERENCES* form will open with the relevant details. To return to the *SITES* form click **Back**.

The user can also add new sites to the *new green* database (discussed in “SECTION C: Advanced users Guide”).

B.3.2 Images

This opens the *IMAGES* form. On this form the user can view images of various species that are stored in the *new green* database. To view the details of the species concerned, highlight that species in the “Species for Image” window and click **View**. The *SPECIES* form will open with the details of that species. To return to the *IMAGES* form click **Back**.

The user can also add new images (discussed in “SECTION C: Advanced users Guide”).

B.3.3 References

This opens the *REFERENCES* form. On this form the user can view information pertaining to specific references cited in the *new green* database. These references are linked to the relevant species. To view the details of a referenced species, highlight that species and click

[View](#). The *SPECIES* form will open with the details of that species. To return to the *REFERENCES* form click [Back](#).

The user can also add new references (discussed in “SECTION C: Advanced users Guide”).

Section C ADVANCED USERS GUIDE

C.1 HOW TO ADD YOUR OWN INFORMATION TO new green

new green is designed to be an expandable database. As new information becomes available so it can be entered and the database can be kept current. Below are discussed the main ways of updating existing information or adding new information.

C.1.1 Editing existing information

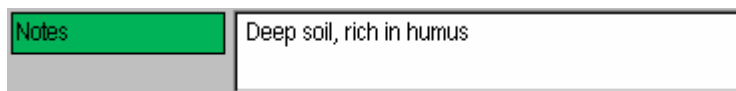
All the forms of the new green graphical interface are editable. This means the user can permanently alter the stored data in the underlying tables of new green by editing specific data on a form. For example, if the family name of a particular species changed, the user could call up that species on the *SPECIES* form, select the family name field and type it to the new name. This new name would be permanently stored in the database and the old name lost. For this reason, the user must exercise caution not to alter information by accident on any forms.

Information can be edited in different **controls** in new green. These controls behave in slightly different manner and are discussed below:

Text boxes

Information can be edited in a text box as one would edit any text document. Click on the text at the desired location and perform the edit. A scroll bar on the right-hand side of the text box can be used to scroll down the document.

Figure C1.1-1: An example of text box



Combo boxes

Combo boxes are a combination of a list box and a text box. In a combo box the user can either type in a value or select one from the list. It is recommended that a value be selected from the list. This is so that data can remain comparable and can be more easily categorised. However, the user can enter a new value if there is nothing suitable on the list. To do this, the user can type in a value and press ENTER. A message box will appear notifying the user that this item is not on the list. The user should choose to add it to the list.

Figure C1.1-2: An example of a combo box

Water requirements

- a) Permanently submerged (over 0.5m water depth)
- b) Swamp / marsh (less than 0.5m water depth)
- c) Seasonally inundated
- d) Marginal to river / dam
- e) Moist soils / high water table**
- f) Well drained, porous soils
- g) Dry

Sub-forms

Sub-forms are forms within forms. They are used to capture multiple entry data. For example: SA Distribution in the *SPECIES* form. As a species may occur in more than one area, the user must be able to select more than one region per species. Sub-forms allow this by replicating a control the moment it is filled in. The new, empty control appears directly below the old one, and can then be assigned a different value. A scroll-bar appears on the right-hand side to allow the user to scroll down to the new control.

Sub-forms use textboxes and combo boxes and they can be edited as described above. Deleting information from a sub-form is achieved by highlighting the item to be deleted and clicking Del.

Figure C1.1-3: An example of a sub-form. Note the new blank fields below the ones containing data

SA Distribution

- Eastern Cape
- Eastern Seaboard
- KwaZulu-Natal
- Swaziland
-

C.1.2 Adding a new species

On the *SPECIES* form, click Add. A blank form will be opened and the user can then fill in all the details for that new species in the manner described in “Editing existing information” above.

C.1.3 Adding a new reference

On the *REFERENCE* form click Add. A blank form will be opened and the user can then fill in all the details for that new reference in the manner described in “Editing existing information” above.

On the *SPECIES* or *SITES* form click the “References” tab control. Type in the name of the author, if the database does not recognise this author, a message box will appear asking you if you want to add this author to the list of references. On clicking yes, a sub-form will open that allows the user to type in the details of his new reference. These details will be added to the *new green* reference table.

C.1.4 Adding a new site

On the *SITES* form click Add. A blank form will be opened and the user can then fill in all the details for that new site in the manner described in “Editing existing information” above.

On the *SPECIES* form, the user can add a new site name by clicking the “Sites” tab control and typing a new name into the “Site” combo box. However, the user must then go to the *SITES* form to add the other details of the new site.

C.1.5 Adding a new image

Images must be in Bitmap format.

On the *IMAGES* form click Add. A blank form will be opened and the user can then fill in all the details for that new image in the manner described in “Editing existing information” above. The image can then be added by clicking Insert or link Image file. A window will open that asks the user to specify the location of the image.

C.2 WHERE DATA ARE STORED IN *new green*

All the data in *new green* are stored in sets of inter-linked tables. A list of all the tables can be viewed by clicking the “Tables” tab control in the database view. The relationships between these tables can be viewed by clicking “Tools” and then “Relationships” on the MS Access menu. It is extremely important that these relationships are not destroyed or disrupted. It is these relationships that allow the *new green* database to function.

For all the tables in *new green*, the naming protocol is as follows: The first letter of the name describes the type of object (i.e. Table). The next word describes the object’s content (i.e. “Species” information, “Site” information, “aList” of names etc.). A second word attached to the name (optional) refers to the subset of information contained in that particular object. These words are all separated by an underscore (“_”).

e.g. T_aList_Biome a list of all Biomes used in the database

T_Species the table storing the basic species information

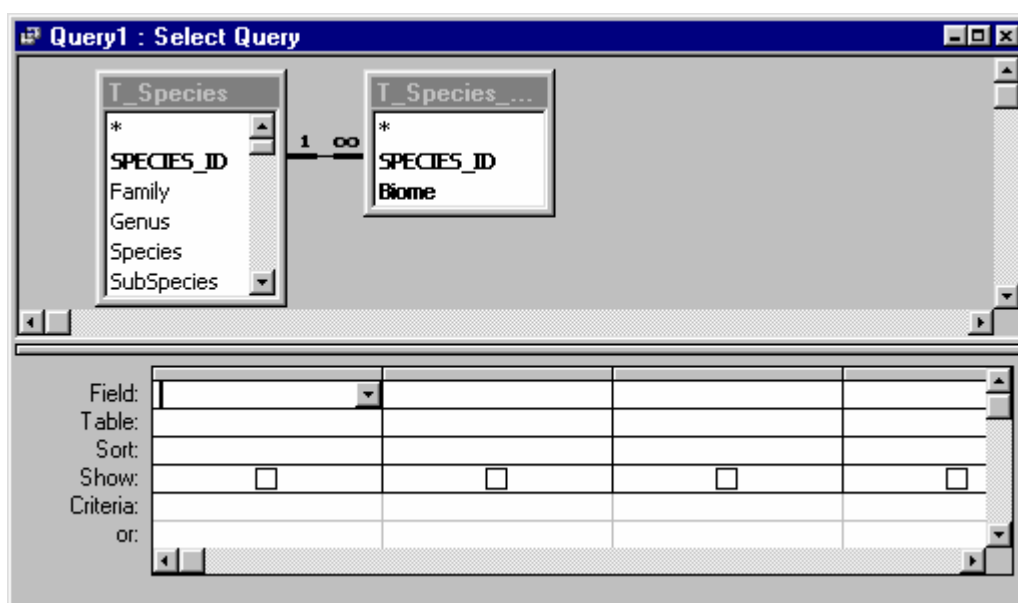
T_Species_Geology the table storing the Geology component of the species information

C.3 HOW TO CREATE YOUR OWN SEARCHES (QUERIES) IN new green

It may be useful for the user to create his/her own queries in new green to search for specific information. Queries can be created as follows:

- 1) Click Database view on the *MAIN* form, click “Query” on the database window and then “New”.
- 2) Select “Design View” and click “Ok”. The query design window comes up and asks the user to select the table/s on which the query should be based.
- 3) Select the relevant table and click “Add”.
- 4) If the user had selected T_Species and T_Species_Biome, the screen should now look something like the figure below:

Figure C3-2: Query design grid



- 5) The next step is to decide what fields are to be involved in the query. Fields can be involved in 2 ways: those that are displayed as columns in the resulting table, or those in which certain criteria have to be met.
- 6) Double-clicking on a field adds it to the query. Fields should be added in the sequence that the user wishes to see in the results table. In this example SPECIES_ID, Genus and Species are added from the T_Species table, and Biome is added from the T_Species_Biome table.

Each field is added with a tick in the “Show:” check box. This indicates that the field will be displayed in the table. In this example we do not want SPECIES_ID to appear in the results table, so its Show check box is cleared.

- 7) The results can be sorted by one or more fields, by click “Sort:” and selecting Ascending or Descending. In this example, the query is sorted by Genus in ascending order and by Biome in descending order.
- 8) The search criteria are entered in the appropriate column/s of the “Criteria” row. In this example we only wish to see species that occur in the “Fynbos” biome.

Syntax for the search criteria:



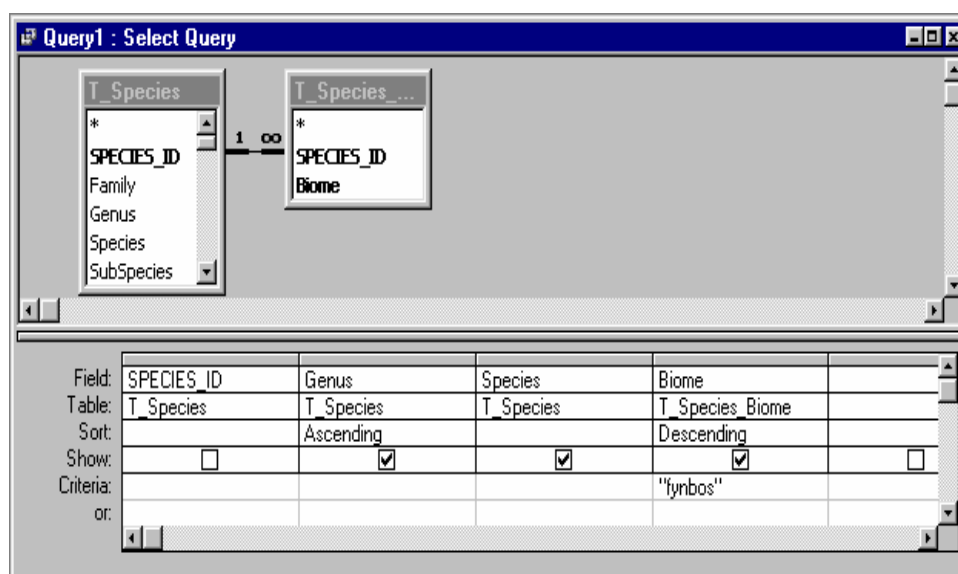

- if text in the field has only a few alternatives then you can enter the alternative you want in inverted commas
 - if the search text might be embedded in other text, such as “grows in **wet** places”, then the text must be surrounded by the any text indicator (*) and the concatenation symbol (&). Thus to search for “wet” in the above phase, your criteria would look be: Like “*” & “wet” & “*”
 - numeric operators can also be included. Thus, searching for plants less than 2m tall would have the following criteria in the height column: >= 2 (or less than or equal to 2)
- 9) You query design should look like the figure below. To test your query, click the datasheet view button () on the standard toolbar. To go back to the design view click the design view button ().

Figure C.3-3: Final query design



Section D GLOSSARY

Command Buttons	buttons located on forms that perform commands when clicked. Navigating through the new green interface should be done by using command buttons. All of the pre-programmed functions can be accessed by using command buttons. Command buttons are identified by ...
Controls	All the information on a form or report is contained in controls. Controls are objects on a form or report that display data, perform actions, or decorate the form or report. For example, you can use a text box on a form or report to display data or a command button on a form to perform an action.
Database window	The MS Access window that gives direct access to the Tables, Queries, Forms, Reports, Macros and Modules of the new green database.
Drop-down box	the  associated with combo boxes. Clicking on this symbol opens a list box below the control.
Fields	Categories of information in the database. Each species entered in the new green database, has numerous fields attached to it. Examples of these fields are minimum rainfall, maximum temperature, water requirements etc.
Forms	are a graphical way of displaying data more conveniently. Forms are used to present filtered and sorted data from one or more tables in a clear and simple manner.
Graphical interface	the collection of forms that allows the user to view and search the new green database in a visually convenient manner. Without this graphical interface, the user would have to search and filter the database manually before any useful information could be extracted.
Null	refers to the absence of any data. When a field is left blank, with no information entered, that field is said to contain a “null” value.
Null-searched species	<p>refers to a species returned by a search that was selected on the basis of not having a value in the specific criterion that was searched.</p> <p>e.g. Species X tolerates a minimum rainfall of 550mm per annum. The minimum rainfall limit for Species Y is not known, or has not been entered into the new green database. If a search is conducted for all species that can tolerate a minimum rainfall of 600mm per annum, both Species X and Species Y will be returned in the search results, Species Y being a “null-searched species”.</p>
Pre-programmed Functions	To simplify the search for information, new green has numerous pre-programmed functions that are available to the user. These functions are all run by clicking command buttons on the graphical interface. These functions typically ask the user to select or enter some information before searching the database for relevant species.
Queries	are the MS Access term for “Searches”. You use queries to view, change, and analyse data in different ways. You can also use them as the source of records for forms and reports.

Reports	are the way data is presented in a printed format. Reports operate in a similar manner to forms, presenting filtered and sorted data from one or more tables in a clear and simple manner, and can be printed out.
Parameters	are values that can be passed to a search or query. Parameters allow the same search to be run for different items simply by changing the parameters and without having to change the structure of the search.
Tab Controls	are buttons on a form that toggle between different sets of information when clicked.
Tables	contain all of the data in a database
User-defined	refers to anything that has been entered or selected by the user. This differs from “pre-defined”, where the value has been pre-programmed into the <code>new green</code> database.