GreenGene 1.0

User's Manual

http://www.sf.net/projects/yellowleaf

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1. Site Administrator

1.1 Overview

GreenGene administration is divided between 3 user groups: a Site Administrator, Professors, and TA's. Professors and TA's have the rights to manage their respective courses. However, Site Administrators manage the installation of GreenGene in order to create/delete courses, and manage the Professors/TA's therein.

1.1 Managing Courses & Administrators

In order to create a course, the Site Admin should click the Create Course button. After entering a course name and description, it is necessary to also pick a User ID, First and Last Name, as well as a Password, for the Professor whom will be primarily responsible for the course.

Each course must have at least one Professor. All Professors will have the same privileges, regardless of the order of creation.

In order to delete a course, select the courses from the Manage Course page by using the checkboxes on the left-side of the list. It is necessary to enter your own Site Administrator password to confirm this deletion as it is an irreversible action.

When a course is deleted, all problems, traits, and associated students and administrators are permanently deleted.

To modify a course, click the Modify button from the Manage Courses page.

From this page, the Site Admin may delete Professors and/or TA's by selecting them using the checkbox, and clicking the Delete button.

The Site Admin may also modify the course name and description. This options are displayed to students when they log into the system.

The Site Admin may modify or create new Professors and TA's for the course. A unique User ID must be entered, as well as first and last names.

Professors may manage all aspects of the course (include problem templates and students), while TA's may only manage students (including assigning problems and viewing their progress).

For further details about the differences between Professors and TA's, see sections 3 and 4.

1.2 Modifying Account Preferences

The modify my account button enables the Site Admin to change his/her first and last name. This name does not appear to anyone else on the site, other than on the toolbar when logged in as the Site Admin.

2. Professor (Course Administrator)

2.1 Overview

All Professors in GreenGene are associated with one course, and they will have complete control over the management of that course. A Professor has all the same privileges as a TA (see Section 3 for details). In addition, a Professor will also have the ability to modify the course description, create additional Professors and TAs to assist with course and student management, and manage problem templates.

2.2 Managing & Creating Problem Templates

2.2.1 Managing Problem Templates

By selecting Manage Problems from the Problem Menu, the Professor is directed to the main page for managing the problems created for the course. On this page, the Professor will see the list of problem templates. Each row of the table displays Name, Description, and Last Modified. In addition, a set of 3 buttons (View, Modify, New Problem) is shown beside each problem corresponding to the actions that can be taken.

Problem Templates create an easy path for Professors to quickly assign similar problems to many students without having to manually create them all.

2.2.2 Modifying a Problem

By clicking on Modify, the Professor is directed to a new page that shows the current problem parameters. On this page, the Professor will see the fields of Problem Name, Problem Description, Progeny Per Mating, Maximum Progeny, and Display Order of Genes". In addition, the Professor will also see the detailed information recorded on each of the 3 genes associated with the problem. The Professor has the ability to modify the current problem information by selecting the corresponding field and updating its values.

If the current problem has already been assigned to a student, modifying the parameters will not have any effect on the student's problem. Each of the students receives their own copy of the problem during assignment, so any changes made to the original problem will not propagate to the student copies of the problem.

When the Professor is ready to save the updated information, he/she can press the "Modify" button. If the change is successful, the Professor is redirected back to the main page for managing problems.

2.2.3 Viewing a Problem

By clicking on View, the Professor is directed to a new page that shows the

current information stored about the problem. On this page, the Professor will see the fields of Problem Name, Problem Description, Progeny Per Mating, Maximum Progeny, and Display Order of Genes. In addition, the Professor will also see the detailed information set for each of the 3 genes associated with the problem.

Below the problem summary, the Professor will also see a table showing the list of students that have been assigned a problem from this template. The table has the columns of User Id, Problem Name, and Modified Version. Since a Professor has the ability to modify the problem parameters during assignment, and the Professor also has the ability to modify the original problem by itself after assignment, a situation may arise where the problem parameters from the original problem will differ from the ones found in the student problem. Hence, the field of Modified Version will tell the Professor whether or not such a scenario exist – the field will display “Yes” if the current problem parameters differ from the student problem parameters, and “No” if both sets of parameters are identical. The Professor can see the exact parameters of the student problem by clicking on the View button.

2.2.4 Deleting a Problem

On the table showing the list of problems, a checkbox is displayed (in the first column) of each row. To delete one or more problems, the Professor may select the problems and then pressing the Delete Selected button located at the bottom of the table. Note: Deleting a problem is an irreversible action. Once a problem has been removed, it cannot be recovered from the system.

2.2.5 Creating a Problem

The Professor can create a new problem by selecting Create Problem from the Problem Menu. Upon selection, the Professor is directed to a new page where fields are shown for Problem Name, Problem Description, Progeny Per Mating, Maximum Progeny, and Display Order of Genes. In addition, the Professor will see another list of fields for each of Gene 1, Gene 2, and Gene 3.

Problem Name and Problem Description are the parameters which are shown to the student during the simulation. It is intended that the Problem Name would be a crop name.

Progeny Per Mating should be an integer that specifies the amount of progeny that will be generated from each cross, and Maximum Progeny should be an integer that specifies the total amount of progeny that may be produced during a student's simulation. A Professor can also specify the ordering that he/she wants the genes to follow during the simulation. The Professor can select a gene (from the box beside Display Order of Genes) and press the Up or Down buttons to adjust its order accordingly.

By default, the formation for Gene 1 and Gene 2 are set for specifying co-dominance (with 1 option to choose a trait, and 3 options to specify the 3 phenotypes). If the Professor wants to issue dominance, he/she can check the box beside Dominance and the formation will adjust accordingly (with 1 option

to choose a trait, and 2 options to specify the 2 phenotypes).

In either case, to fill out the information, the Professor will need to select a trait using the option beside Trait Name. After the selection is made, options for each of the phenotypes will be populated with all the phenotypes that are associated with the chosen trait. At this point, the Professor needs to choose the phenotypes (3 for co-dominance, and 2 for dominance) that he/she wants to use for the problem.

If the Professor is filling out Gene 2, he/she also has the ability to specify the linkage distance between Gene 1 and Gene 2 (default is 50). To change the default value, the Professor can check the box beside “Linkage” and update it with the desired value.

Gene 3 also has the same default formation as Gene 1 and Gene 2. However, with Gene 3, the Professor also has the ability to use epistasis by checking the box beside Epistasis. If the Professor chooses to use epistasis, the formation will change to show a box for selecting an epistatic ratio, and a set of options for choosing the phenotypes. By choosing a specific epistatic ratio (one of 9:3:3:1, 9:3:4, 9:7, 12:3:1, 15:1), the number of options for choosing phenotypes will adjust accordingly to match the chosen ratio. By choosing a specific trait, the options for each of the phenotypes will be populated with all the phenotypes that are associated with the chosen trait. At this point, the Professor needs to choose the phenotypes that he/she wants to use for the problem.

If the Professor is using epistasis for Gene 3, he/she will not have the ability to specify the linkage distance between Gene 2 and Gene 3 (it will be defaulted to 50). Otherwise, if the Professor is using either dominance or co-dominance, he/she will be able to specify the linkage distance between Gene 2 and Gene 3. To change the default value, the Professor can check the box beside Linkage and update it with the desired value.

When the Professor has filled out all the information of the problem and is ready to proceed, he/she can press the Create Problem button.

2.2.6 Creating Problems From Existing Problems

By selecting Manage Problems from the Problem Menu, the Professor is directed to the main page for managing problem templates for the course. At this point, the Professor can press the New Problem button beside a corresponding problem, and the Professor will be directed to a new page showing all the current information of the selected problem. This page lets the Professor create a new problem based on the parameters of an existing problem. Hence, the Professor has the ability to select any field and change its values. When the Professor is ready to proceed, he/she can press the Create Problem button, and a new problem will be created. If the creation is successful, the Professor is directed to a page that shows a summary of the newly created problem.

2.3 Managing Traits & Phenotypes

Problem traits and phenotypes are created to be re-used in different problems. Once a trait has been created, it can be found and referred to in the problem creation page.

A trait may be created by selecting Create Trait from the Problem Menu. A list of existing traits can be viewed in the trait management page by selecting Manage Traits from the Problem Menu.

Each trait may have indefinite number of phenotypes associated with it. To modify Phenotypes, select the Modify Trait button.

2.4 Managing Students

A Professor manages the list of students of the course through the same sequence of actions as a TA. Like a TA, a Professor has the ability to manage students, import students, assign student problems, and view student progress. For full details, please refer to Section 3 for Teaching Assistant.

2.5 Managing & Creating Administrative Users

2.5.1 Managing Administrative Users

By selecting Manage Admins from the Course Menu, the Professor is directed to the main page for managing the Administrative users registered for the course. Each row of the table displays User Id, First Name, Last Name, and User Type. The User Type field will display either one of Professor or TA, and this information denotes the privilege level that the user has in this course. In addition, a Modify button is placed beside each user.

2.5.2 Modifying an Administrative User

By clicking on Modify, the Professor is directed to a new page that shows the current information stored about the Administrative user. On this page, the Professor will see the fields of User Id, First Name, Last Name, User Type, and Password (enter twice). The user's User Id may not be modified once the user has been created. The Professor can also modify the account password by entering the new password two times. If the change is successful, the Professor is redirected back to the main page for managing Administrative users.

2.5.3 Creating Administrative Users

The Professor can create a new Administrator user for the course by selecting Create Admin from the Course Menu. Upon selection, the Professor is directed to a new page where fields will be shown for User Id, First Name, Last Name, User Type, and Password.

UserId must be alphanumeric characters only, 10 characters maximum. The password entered may be any sequence of characters, 3-25 characters in length.

2.6 Managing Course Preferences

The Professor can update the course information by selecting Modify Course from the Course Menu.

3. Teacher's Assistants (Course TA)

3.1 Managing Students

By selecting Manage Students from the Student Menu, the TA is directed to the main page for managing the students registered into the course. Each row of the table displays User Id, First Name, Last Name, and Assigned Problem. In addition, a set of 2 buttons (Modify and Assign Problem) is are shown beside each student corresponding to the actions that may be taken.

3.1.1 Modifying a Student

By clicking on Modify, the TA is directed to a new page that shows the current information stored about the student. On this page, the TA will see the fields of User Id, First Name, Last Name, Progeny Per Mating, and Max Progeny. If the student has been assigned a problem, the TA will also see the current simulation setting for progeny per mating and maximum progeny. The TA has the ability to modify the current student information by selecting the corresponding field and updating its values. The User Id, however, may not be modified. Furthermore, the TA may also reset the student account password by selecting the checkbox beside Reset Student Password.

3.1.2 Deleting a Student

On the table showing the list of students, a checkbox is displayed (in the first column) of each row. To delete one or more students, the TA can select the students (by checking off the corresponding checkboxes) and then pressing the “Delete Selected” button located at the bottom of the table. Deleting a student is an irreversible action: once a student has been removed, she/he cannot be recovered.

3.1.3 Creating a Student

The TA may create a new student by selecting Create Student from the Student Menu.

UserId must be alphanumeric characters only, up to 10 characters in length. After student creation, the TA can also request to assign a problem directly by selecting the checkbox Assign Problem Now.

If the creation is successful, and “Assign Problem Now” was selected, the TA will be directed to another page where he/she can assign the student a problem. Otherwise, the TA is redirected back to the main page for managing students.

Passwords are generated automatically for a student after account creation (or if the TA requests to reset the student account password). The generated password will consist of the student's last name (consisting of only its alphabetical characters, and in lower-case) appended to the first character of the student's first name.

For example:

- "Joe User" will have a generated password of "userj"
- "Bob None123" will have a generated password of "noneb"

3.1.4 Importing Students

The TA may import a list of students to the course by selecting Import Students from the Student Menu. On this page, the TA will see two buttons, Browse and Load. By selecting Browse, the TA will be given a dialogue box where he/she can browse through the file system to locate the comma separated values file (CSV) to import.

The input file format must be of a certain type: commas separate the 3 entries for UserId, First Name, and Last Name: one per line, and in this precise order.

To import the selected file, the TA should press the Load button. Then, the TA will be shown a table displaying the list of student records that were parsed from the CSV file. All student records that were parsed successfully are shown at the top half of the table, while records with parse errors are displayed at the bottom half of the table.

At this point, the TA can choose to manually update any student record currently displayed. The TA also has the option to assign a problem to a student by selecting a problem name from the problem option boxes. By default, only the student records without parse errors are selected for creation. When the TA is ready to proceed, he/she can press the “Create Students” button, and this will create the list of students that have been selected. If the account creations are successful, the TA is redirected back to the main page for managing students.

3.2 Assigning Problems to Students

By selecting Manage Students from the Student Menu, the TA is directed to the main page for managing the students registered into the course. At this point, the TA can assign a problem to a student by clicking the Assign Problem button. The TA will be directed to a new page that shows a list of problems. When the correct problem for assignment has been located, the TA should press the Assign button.

Note that if a student has already been assigned a problem, assigning him/her a new problem will replace the previous problem, and the simulation will start over from the beginning. All previous problem data will be lost.

Professors have the option of modifying the problem parameters during assignment. On the page that displays the list of problems, the Professor will see the Modify and Assign button. By clicking on Modify and Assign, the Professor is directed to a new page that shows the current parameters of the selected problem. At this point, the Professor can modify any fields of the problem, and then click Assign to proceed with the problem assignment. Note that the problem

modifications performed on this page will not have an effect on the original problem (the changes are for the specific student only).

3.3 Viewing Student Progress

The TA may view the progress of a student by selecting View Progress from the Student Menu. On this page, the TA will see the list of students displayed with their assigned problems. Click the View Progress button to view the student's simulation.

The TA is then redirected to the student's simulation page showing the latest cross results of the simulation. At this point, the TA may view the simulation from the perspective of the student. The TA has all the abilities of a student such as viewing the results of a cross, and exporting progeny data. However, the TA may not perform any new crosses.

To return and exit the simulation, the TA should press the Back to Admin View button located in the toolbar.

4. Student

4.1 Viewing Progeny

Once a problem has been assigned to a student, the initial cross will automatically be performed by the system and the initial set of progeny is generated. Once logged in, a student will automatically be directed to the latest cross and will see the progeny associated with that cross.

From the Display Cross selection box located in the toolbar, the user may select the cross number they wish to view. The data for the respective cross chosen will be displayed. A cross header contains the following: the pollen and seed plant for each cross (their traits and phenotypes), and the date and time the cross was performed. All cross headers contain the above information, except for Cross 1 (which is the initial set of progeny), for which this information is intended to be hidden from the student.

For each cross displayed on the screen, the user may click the "+" image next to a particular cross header to expand and show all the progeny for that cross. To hide all the progeny for a particular cross, click the "-" image next to a particular cross header.

From the Display Cross selection box, the user may also choose to view All. This will display all the crosses performed by the user simultaneously. By default, all the progeny for each cross will be shown. To hide all the progeny for a cross and only display the cross headers, click the Hide All button. Conversely, to show all the progeny for each cross, click the Show All button.

4.2 Performing Crosses

To perform a cross, the Student must select both a pollen and seed plant. These may be the same plant if desired (i.e. self-pollination), may be two different plants within the same cross, or be two different plants from different crosses.

View the progeny for the cross from which you wish to select either the pollen or seed plant (see Section 4.1 for instructions on how to view progeny). Next to the plant which you wish to use as the seed or pollen plant, click the appropriate Pollen or Seed button. Once the button has been clicked, a rectangular display box (cross display box) will appear at the bottom of your screen which contains the plant information for the pollen or seed plant you just selected. Repeat the above steps to select the second plant for the cross. To change a previously selected pollen or seed plant, simply click appropriate Pollen or Seed button next to the plant and the information in the cross display box will be updated accordingly.

Once both plants have been selected, click the Perform Cross button on the cross display box. To not perform the cross, click the Cancel button on the cross

display box – this will cancel the cross and hide the cross display box.

Only students may perform crosses.

4.3 Exporting and Printing Progeny

To export progeny data to a comma-separated values (CSV) file, view the progeny you wish to exported (see Section 4.1 for instructions on viewing progeny). Note that the progeny for each cross need not be displayed, but it is essential that the cross header be showing as only these crosses (and their associated progeny) will be exported. Once the desired crosses are displayed on the screen, click the Download Data button. The user will be prompted to download the file. Click Save to save the file to your computer or click Open to open the data in Microsoft Excel directly. Click Cancel to cancel the download operation.

To print the progeny data, have the cross headers for which progeny is to be printed, showing on the screen (see see Section 4.1 for instructions on viewing progeny). Click the Printer Friendly link in the top right hand corner of the screen. A new window will be displayed.

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Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

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