

Changing the Phenotypes in Genetics Construction Kit

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Genetics Construction Kit (GCK) is a simulation that enables students to mate fruit fly like organisms. The current version of GCK (version 1.03) is currently configured to define eight *Drosophila*-like phenotypic traits: Eye Color, Wing Shape, Thorax, Scutellum, Abdomen, Eye Shape, Bristles, and Arista. Each trait can have from 2 to 20 variations. For instance, there are 20 variations of Wing Shape and 7 of Abdomen, but only 2 for Scutellum.

Fruit flies are a traditional organism used by geneticists for nearly 100 years. But what if you would like to define different traits or modify the traits altogether so that they describe phenotypes for a different organism? If you have access to a resource editor, such as ResEdit, it is quite easy to make these modifications. The steps to follow are outlined below. We'll use ResEdit, since this application is common, but you could modify the steps to fit your own favorite resource editor.

NOTE: You will only be modifying the names of the traits and their variations. The genetics of the problems will not be changed.

1. **MAKE A BACKUP COPY OF YOUR GCK PROGRAM!!** You will be modifying the resources of the application and this is always a slightly risky procedure. Make sure that you have an unmodified copy put away somewhere safe. The copy on The BioQUEST Library CD is locked and can't be modified, so as long as you know where your CD is, you'll be safe.
2. Start the ResEdit application. Under the File menu, choose "Open." In the resulting dialog box, locate your GCK application, select it, and then click on the "Open" button in the lower right.
3. A window similar to the one in Figure 1 will open. This is the resource window for GCK and it contains icons representing all of the resources in the GCK program. In the bottom row, locate the icon labeled "TNAM."
4. Double-click on this icon. This will open a window displaying all of the TNAM resources in GCK (Figure 2). These are the resources that define the names of the traits and their variations.

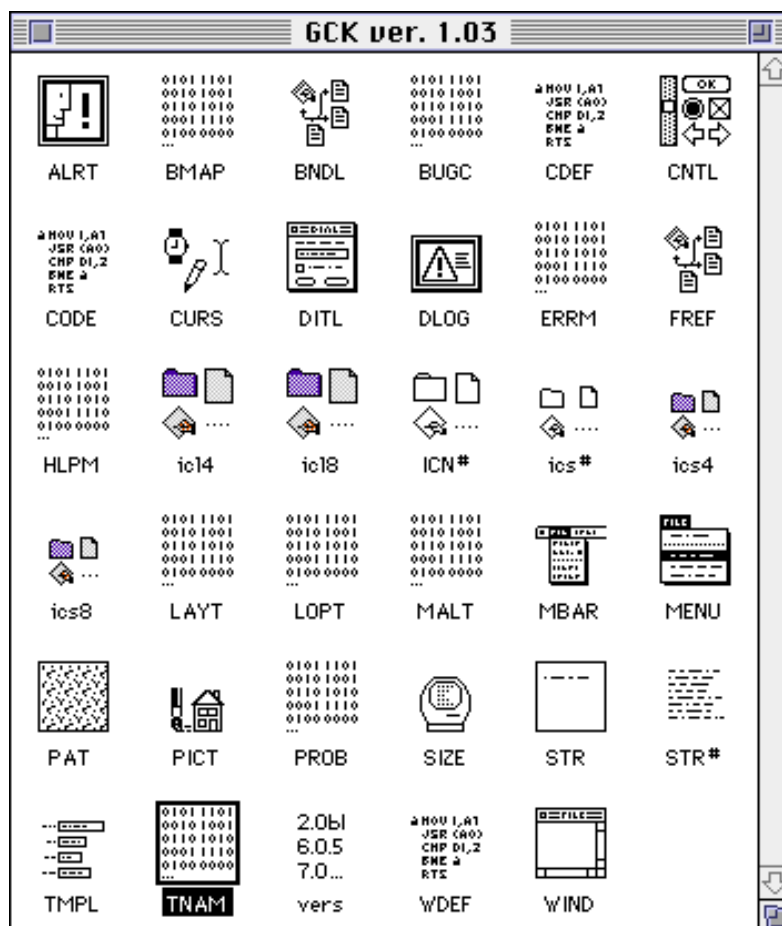
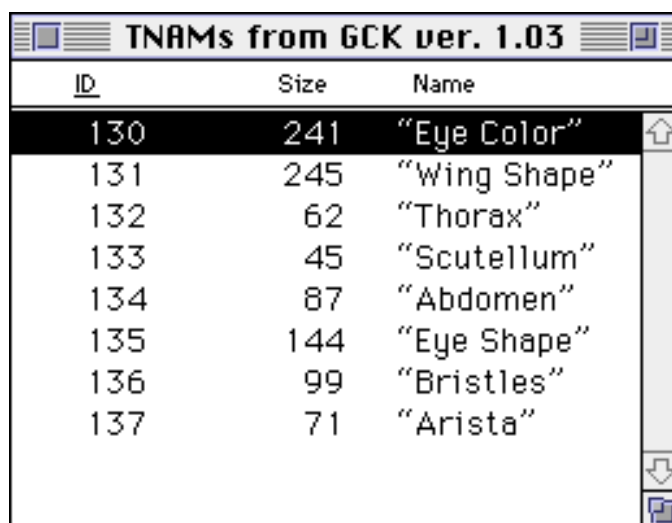


Figure 1



ID	Size	Name
130	241	"Eye Color"
131	245	"Wing Shape"
132	62	"Thorax"
133	45	"Scutellum"
134	87	"Abdomen"
135	144	"Eye Shape"
136	99	"Bristles"
137	71	"Arista"

Figure 2

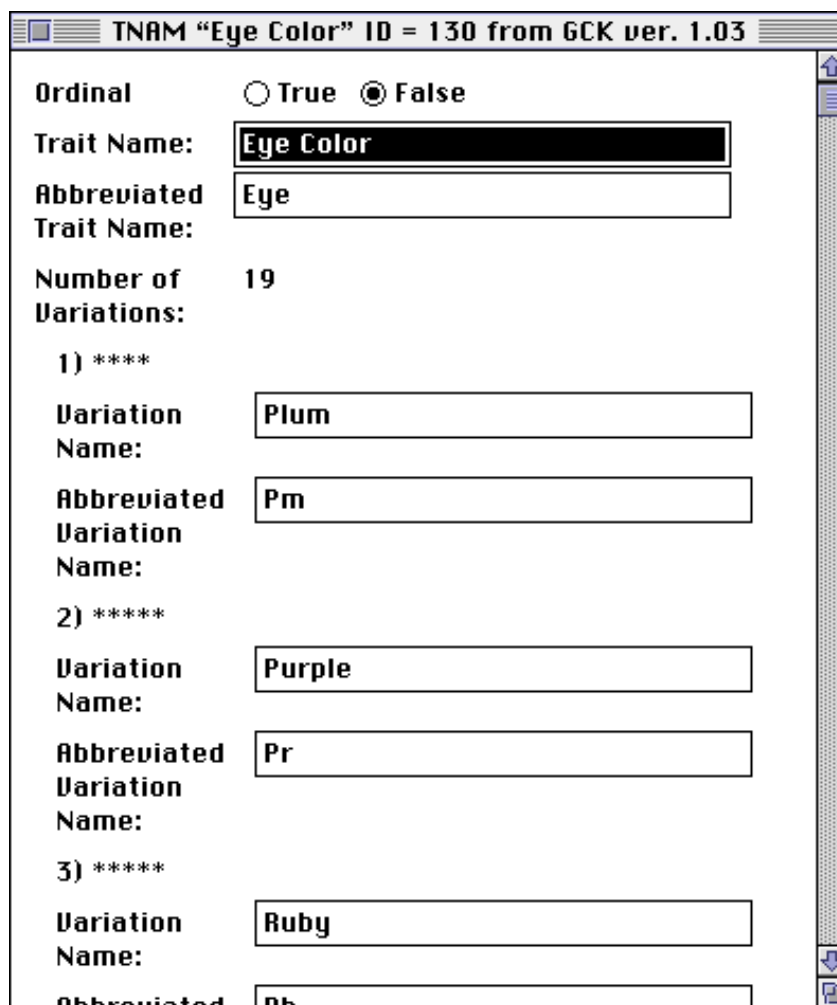
5. Choose one of these traits and double-click on it. This will open a window similar to the window for "Eye Color" shown in Figure 3.

6. Notice that the first item defines whether the trait is ordinal or nominal - you should not change this item.

7. The next item defines the name of the trait. You can modify this text by selecting the text in the box, deleting it, and then typing in the trait name you prefer.

8. The item directly underneath this is the abbreviated form of the trait name. You can modify this in the same way, by selecting the existing text, deleting it, and entering your own text.

9. The next item defines the number of variations of this trait. You can add or delete variations if you need to (see step 12 below).



TNAM "Eye Color" ID = 130 from GCK ver. 1.03

Ordinal ☐ True ☒ False

Trait Name:

Abbreviated Trait Name:

Number of Variations: 19

1) ****

Variation Name:

Abbreviated Variation Name:

2) *****

Variation Name:

Abbreviated Variation Name:

3) *****

Variation Name:

Abbreviated Variation Name:

Figure 3

10. Following the number of variations is a list of all the variation names, each with its abbreviation. You can modify a name by selecting the text in the box, deleting it, and then typing in the variation name or abbreviation that you prefer.
11. To add a new variation name, scroll down to the bottom of the list of variation names. Click on the final entry, a row of five asterisks to select it. Choose "Insert New Fields" from the Resource menu. To delete a variation, select the corresponding set of five asterisks to select it, and then press the delete key or choose "Clear" from the Edit menu.
12. When you are finished modifying this trait click on the close box in the upper left-hand corner to close the window. If you want to modify other trait names, just open the window for that trait and follow the procedure outlined above.
13. If you would like to add an additional trait, make sure the TNAM Resources window is open (Figure 2, above) and choose "Create New Resource" from the Resource window. In the window for the new trait, set "Ordinal" to False. You can now add variations as described in Step 12.
14. You can also delete any traits that you don't want to use. In the TNAM Resources window (Figure 2), select the trait you want to delete by clicking on it once. Now under the Edit menu choose Clear. The trait will be deleted and will disappear from the list.
15. When you are finished making all of your changes, be sure that you save the new version of the application by selecting Save under the File menu. ResEdit does not give you the option to save under another name so you'll probably want to be sure that you change the name of the application yourself to avoid confusion later.
16. Finally, quit ResEdit and test your new version of GCK to be certain that it works the way you want it to.

That's all there is to it. If you have any problems or questions, you can email Virginia Vaughan at vvaughan@hamilton.edu or call her at 315-853-1657.

If you are using the newest version of GCK (version 1.1β2 Beta, on Volume IV of *the BioQUEST Library CD*) it will soon be possible to edit some of the resources that define the basic genetics of the problems. If you would be interested in receiving instructions for doing this, please contact Virginia Vaughan.