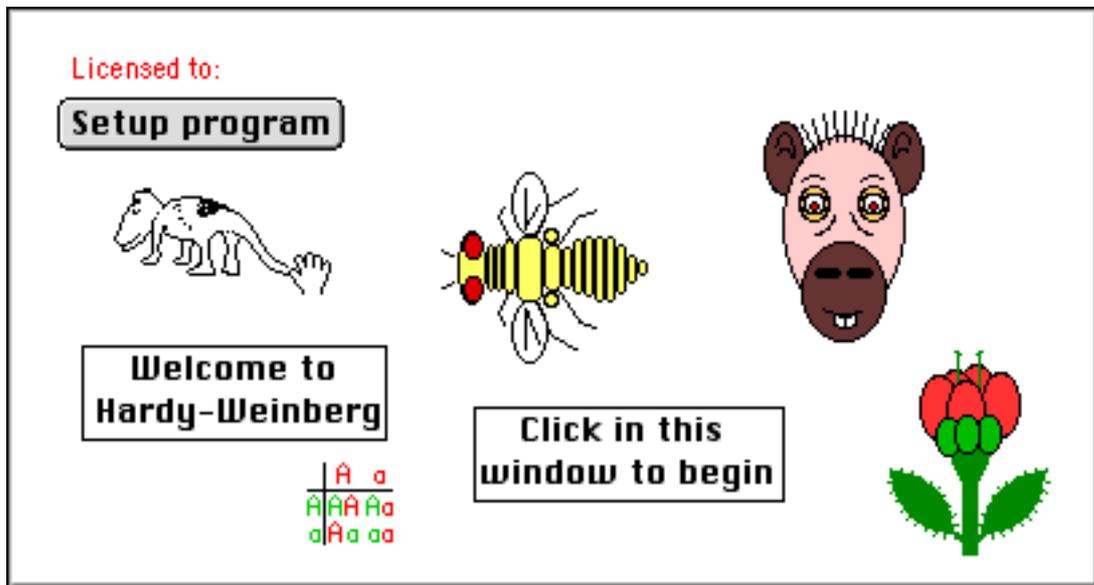


## Teacher's guide to the Hardy-Weinberg program

The Hardy-Weinberg program simulates the sampling of a population of animals or plants. The program is based on the Mendelsim program, with the same organisms and with similarities in the menu structures of the two programs. The Hardy-Weinberg program, however, generates a single exercise, as opposed to a large choice of exercises in the Mendelsim program.

### Setting up the program

The program is provided in a form which needs to be set up for a class, at minimum by putting in a password. When the program is activated, it will show the following screen, including the name under which you have registered the program:



Click on the 'Setup program' button. This will lead to the following screen:

**Welcome to Hardy-Weinberg**



**The purpose of this run of the program is to set up the program for a class of students. See manual for details.**

**You can nominate to change just the password, or to change the exercises as well.**

**Password only**

**Cancel**

**Continue**

Click on the Continue button. You can, if you wish, also uncheck the 'Password only' checkbox, and change the exercises as indicated below.

The program will now present you with a box for the entry of the password. After setting this, the program is ready for distribution to the class.

## Changing the exercise

A number of parameters can be changed to make the exercise easier or more difficult. Although the 'Setup program' key will not be shown in the Introduction screen following the change of password, the setup screens can be accessed as follows. Click on the hand in the Introduction screen while holding down the 'Alt' key (Windows) or the 'Apple/Command' key (Macintosh). Enter the password in the next screen. If the password is correctly entered, the program shows the screen below. If not, the program defaults to the exercises.

**HARDY-WEINBERG ANSWERS**

**Note the extra Answers menu.**

**You will be prompted for a student name/number. Additional student names may be requested from the Answers menu.**

**Use the Save answers button to save a text version of the answers:**

**Click OK to start checking student answers without saving**

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**You also have the option to: (1) Start again with a new password ('Reset'). (2) Change some of the parameters ('Edit'). (3) Inspect the parameters without making changes ('Check').**

This screen serves the joint purpose of allowing answers to be obtained (see below) or editing the exercises. Clicking on the **Edit** button leads to the following screen, showing the current default values assumed by the program:

**Unavailable organisms:**

Dinosaur dog (*Tyrannosaurus canis*)

Monkbear (unknown sp.)

Fly (*Drosophila primitiva*)

Plant (*Arabidopsis imaginera*)

Sexes

Sex in monkbears

Censor male dogs

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No cages

No Auto fill

No Auto names

Show name

Show 4-digit number

Random characters

No marks

No timing

No answers

OK

The top part of the screen is devoted to the choice of organism, as well as to the use of sexes. The Hardy-Weinberg program assumes a single autosomal locus, so that examples with and without sexes are very similar. The 'Sex in monkbears' box is checked, which means that all four organisms will be used (see Mendelsim instructions). Astute students who are given flies for their exercise will notice that all flies are female. (Maybe a female lure is being used for trapping!)

The most important choices which have to be made are in the first column of the lower part of the screen. If the **No cages** box is checked, the student will have to count all the organisms by hand. Cages can be used to group organisms of a particular phenotype, with the program providing a count of the number in the cage.

The following two boxes control automation in the program. If the **No auto fill** box is unchecked, the student will be able to generate large numbers of organisms quickly and without having to check their phenotypes. A minor task is involved in setting up the cages, but the exercise is considerably expedited if automation is included. The use of automatic cage naming further simplifies the exercise.

Please note that the default form of the program has these boxes checked, so that automation is initially turned **off**.

The other important choices have to do with the grading of the exercise. In the default version of the program, the student is asked to put in answers, following which the program assigns a mark to the answers and reveals the form of calculation and the correct answers. This version of the program thus cannot be used for hand marking.

If the **No answers** box is checked, the student will not be told the correct answers. You, the teacher, can find these answers by entering the 'Answer' mode of the program as detailed above. The program then allows the choice of a printout of a text file with the answers, or alternatively allows the correct answers to be shown on the screen.

Please see the instructions to the Mendelsim program for a more detailed description of the choices of the parameter entry screen.

### **Number in the sample**

The program allows the student the choice of the sample size. However there is a minimum size, which is currently set to 100 if there are no cages or no automation, and to 200 if automation is nominated. There is also an upper limit, the total size of the population, which is several hundred. It is reasonably easy to reach the upper limit if automation is available.