Artificial Selection in Fast Plants
Brad Williamson

TITLE and AUTHORS

The title should describe the work to the reader. Include the variables that are manipulated and the author(s)

ABSTRACT

The abstract is a one or two paragraph condensation of the entire article giving the main features and results of the work described more completely in the poster.

High school students investigate artificial selection in FastPlants by selecting for trichome (plant hairs) numbers on the first true leaf's petiole. The investigation is reliable and doable by high school students and serves as a valuable tool for introducing natural selection.

INTRODUCTION

The introduction has three parts: 1) The question asked, 2) Background context—where does this question fit with what is known, and 3) Your hypothesis presented in an "If...then" prediction that structures your research.

QUESTIONS:

Will a population of FastPlants respond to artificial selection pressure for "plant hairiness"?

BACKGROUND:

Bruce Fall has developed a laboratory for introductory biology at the university level. This investigation is an adaptation of his work applied to the high school level.

HYPOTHESIS:

If hairiness in Fast Plants responds to selection then a population of plants with radical selection for hairiness should produce offspring with a greater mean hairiness.

METHODOLOGY

This section should include three sections in sufficient detail so that others can repeat your research.
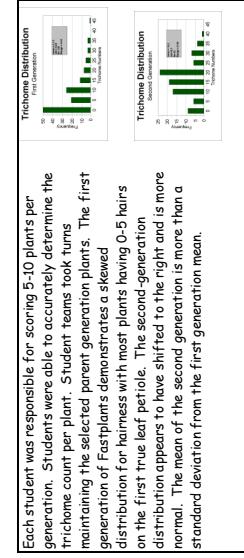
PROCEDURE:

1. Students grow 150 1st generation plants.
2. At day 8-10 students count the trichomes on the first true leaf petiole of each plant.
3. The 15 plants with the highest trichome count are selected for the next generation and pollinated at day 14.
4. Plants are grown, seed harvested and planted for second generation.
5. Second generation plants are scored for trichome counts on day 8-10.

MATERIALS:

Fast Plant Growing System
Fast Plants

STATISTICAL TESTS:

Only descriptive statistics were applied.

RESULTS

Describe the results clearly. Use graphs, tables and charts to help clarify the results. Include a discussion on the statistics you use to describe or test your data. Save any conclusions for the DISCUSSION

Each student was responsible for scoring 5-10 plants per generation. Students were able to accurately determine the trichome count per plant. Student teams took turns maintaining the selected parent generation plants. The first generation of Fastplants demonstrates a skewed distribution for hairiness with most plants having 0-5 hairs on the first true leaf petiole. The second-generation distribution appears to have shifted to the right and is more normal. The mean of the second generation is more than a standard deviation from the first generation mean.

Trichome Distribution — First Generation

Trichome Distribution — Second Generation

DISCUSSION

What do your results mean when you consider the original question or hypothesis? Point out the significance of your results. If the results are unexpected or contradictory, you should attempt to explain why and point out possible avenues for further research.

By only pollinating only the first generation fast plants in the top 10% for hairness the students imposed a radical selection event on the popluation. Offspring (second generation) from these parent plants demonstrated a clear shift in the mean for hairiness (14.2 hairs) compared to the entire first generation mean for hairiness (7.13 hairs). Interestingly the 10% of the 1st generation selected as parents had a mean of 25.5 hairs per plant. Further selection over several generations would indicate the range of selection possible with this plant.

This investigation is works very well to introduce students to the role of inheritance to selection and provides an excellent background for developing an understanding of the mechanisms of natural selection.

LITERATURE CITED

Include all published works mentioned in your presentation. List in bibliographic form.

Bruce A. Fall, Steve Fifield, and Mark Decker, Evolution By Artificial Selection: A 9-Week Classroom Investigation using Rapid-cycling. University of Minnesota, Minneapolis, MN 55455

http://genbiol.cbs.umn.edu/activities/WFP/WFPposter.html

Possible Mini-poster headings used for high school level research or performance assessment. Text is adapted from:
A Handbook of Biological Investigation. Harrison W. Ambrose III and Katharine Peckham Ambrose. 1995. Hunter Textbooks.