Dvc Fri

Date: 4-11-17 Per: 2

# F2 Experiment Analysis

*Unless otherwise directly told, use class-wide data for the analysis below. If you are missing some piece of data, log into www.plantingscience.org and go to the files section and find it there. All answers below must be in complete sentences (unless creating a table or sketching a graph) or else the overall grade will be reduced up to 10%. When referring to data, always be sure to refer to the actual quantities and units. When describing a difference between values, calculate the difference, do not just say "big" or "small." Use a separate piece of paper if necessary,*

(1 pt total point for the immediate information below)

Control: Plants in the same environment as experiment except without wind.

Experimental Variable: A plant in front of a fan to simulate a windy environment

Your individual hypothesis: My hypothesis was that the hairiness per plant would not change between the experiment and control, but that was wrong.

**Analysis:**

1. What was the expected phenotype distribution? What was the actual phenotype distribution in both the control and experiment groups? (1 pt) Was there a significant difference between the expected and the actual distribution in both groups, and, if so, what specifically was it? (1 pt) Is the expression of stem and leaf color due to genetics or environment? (1 pt)

2. What the average number of hairs on each group – control and experiment?(1 pt) Was there a difference between the average number of hairs in each group, and if so, what was it specifically? (1 pt)

3. What experimental variable causes (or did not cause) the difference in hairiness between the two groups? (1 pt) Is this change due to genetics or environment? (1 pt) What specific data from the experiment supports this assertion? (1 pt) What are some functions of hairs (also called trichomes) on a plant's leaf? (1 pt) Speculate how changing (or not changing) the numbering response the environment would help the plant live more successfully. (1 pt)

12.5/13

9.0 Nicely done

4. Speculate on whether genes and/or the environment can have more effect on an organism's body. (1 pt) Cite specific data from the experiment that supports your speculation. (1 pt)

PSGL - purple stem green leaf
NPSGL - non purple stem green leaf
PSYL - purple stem yellow leaf
NPSYL - non purple stem yellow leaf

1. The expected phenotype distribution of the F2's was the 9:3:3:1 ratio; 9 of the 16 plants should have been purple stem green leaf while 3 of the sixteen plants should have been purple stem yellow leaf, and another 3 should be non-purple stem green leaf. Only 1 should have been non-purple stem yellow leaf. In the control the distribution was 65% for PSGL, 15% for both PSYL and NPSGL it was 15%, and the NPSYL was 5%. Its not exactly the 9 3:3:1 ratio, but it is in the same area with one being most common, one with a very small percentage, and two that are inbetween both and have the same distribution. The Experiment also follows these ideas with the PSGL coming in at 44%, PSYL/NPSGL at 25% and NPSYL as 6.25%. There is not much of a difference in the percentages and ratio but they did change in a margin of ±10%. The expression of stem and leaf color, as this data shows, is mostly, if not completely genetic.

2. Experiments average number of hairs was 4.3 and the controls was 1.3. This is a phenomonal difference of 3 hairs per plant. The plants in the wind had 3 more hairs than plants not in the wind.

3. The experimental variable was the wind, which caused the plants to be more hairy than without. The change seems to be environmental but perhaps the wind turns on a gene that tells the plant to grow more hair. To know if that was

the case we would have to run more tests, so we'll say that in this experiment, the change was caused by the environment. Since the average number of hairs per plant is 3 whole hair higher in the experiment, it supports our results. Since all the seeds were the same as well, that shouldn't have caused a varying set of hairs in plants. Some functions of hairs could be to insulate them from both the cold and possibly heat. Another function is to help retain water in the cells. Changing the number of hairs in response to the environment can help the plant survive by allowing it to control the output of $H_2O$ through the leaves. If there is less wind or the temperature is moderate, it won't need as many hairs as if it was windy or an extremely cold or hot temperature.

Very nice

4. The environment can shape a plants genes over several generations, so plants adapt to certain situations. From our experiment, the color of the plant didn't change, only the amount of hairs, so maybe the environment, in this case, specifically wind, shapes the characteristics of the plant that allow it to survive, in this case, it would be growing more hairs. Since neither the color of the leafs or stems changed, or the pheno/geno type distribution, that supports that the environment controls the characteristics to the survival of the plant. Excellent

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(1 pt total point for the immediate information below)

Control: Plants not in wind

Experimental Variable:

Wind blown on plants

Your individual hypothesis:

If plants are grown with a fan blowing on them, then they will grow more hair than plants without wind.

**Analysis:**

1. What was the expected phenotype distribution? What was the actual phenotype distribution in both the control and experiment groups? (1 pt) Was there a significant difference between the expected and the actual distribution in both groups, and, if so, what specifically was it? (1 pt) Is the expression of stem and leaf color due to genetics or environment? (1 pt)

Wisely done!

2. What the average number of hairs on each group – control and experiment?(1 pt) Was there a difference between the average number of hairs in each group, and if so, what was it specifically? (1 pt)

3. What experimental variable causes (or did not cause) the difference in hairiness between the two groups? (1 pt) Is this change due to genetics or environment? (1 pt) What specific data from the experiment supports this assertion? (1 pt) What are some functions of hairs (also called trichomes) on a plant's leaf? (1 pt) Speculate how changing (or not changing) the numbering response the environment would help the plant live more successfully. (1 pt)

4. Speculate on whether genes and/or the environment can have more effect on an organism's body. (1 pt) Cite specific data from the experiment that supports your speculation. (1 pt)

F2 Experiment Analysis

Independent Variable: Wind  Dependent Variable: Hair Growth

1. The expected phenotype distribution was 9:3:3:1, which put into percentages is 56.3:18.8:18.8:6.3. The actual phenotype distribution in the control group was 13:3:3:1, which put into percentages is 65:15:15:5, which is a difference of 8.7:3.8:3.8:1.3 percentages for each phenotype from the expected distribution, which is not significant. The phenotype distribution of the experimental group was 7:4:4:1, which put into percentages is 43.8:25:25:6.3, which shows a percentage difference of 12.5:6.2:6.2:0 from the expected phenotype, which is not significant. Expression of stem and leaf color are due to genetics because both the experimental and control group had phenotypes close to the expected outcome. ✓

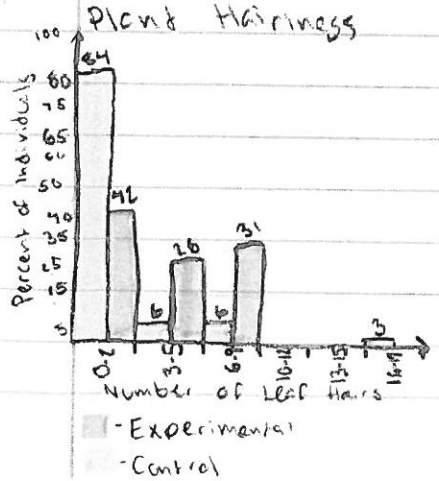
2. The average number of hairs on the control group was 1.27 and the average number of hairs on the experimental group was 4.25. The difference of the average number of hairs of the control and experimental group was 2.98 hairs.

3. The wind caused an increase in plant hairiness in the experimental group. The data that supports this is that the only changed variable was wind, and the experimental group had on average of 2.98 more hairs than the control group, without wind. The bar graph below shows that the experimental group was more consistently hairy

Excellent

+.5 EC

Plant Hairiness



continued 3 This change was due to environment because the difference was too significant to be genetic, an average difference of 2.98 is big. ✓ Some functions of trichomes are to discourage insect predators, reflect sunlight, insulate the plant, or produce chemicals to repel bugs. Increasing the number of hairs on the plant would increase insulation, which the plant would need more of when there is a fan in its environment because that would decrease the temperature. ✓

4 Although the environment may have a significant effect on a plant, genes have a greater effect. There are some things that the environment may not change about a plant because it is rooted in its genes. One example of this from the experiment is that both groups phenotypes were close the expected distribution, which cannot be affected by the environment. basis by each T.S