

The amazonian rain forest called devils gardens

[Science](#), [Geography](#)



The paper "The Amazonian Rain Forest Called Devil's Gardens" is a wonderful example of an assignment on geography. Once you have finished reading the article, answer the following questions to the best of your ability based solely on the information you read in the paper. If you cannot answer the question based on what you read, then simply write that in the answer space.

Why are these regions of the Amazonian rain forest called "devil's gardens"? Because in these regions of the Amazonian rain forest, we can find a large stand of trees consisting of a single species of tree called the *Duroia hirsuta*, which according to the legend, is cultivated by the evil forest spirit. These "devil's gardens" are created by the *Myrmelachista schumanni*, the ants nesting in the stems of *D. hirsuta*, which kills all the other trees except its host through formic acid ((Frederickson, Greene and Gordon, 495).

What is allelopathy? Allelopathy ((Frederickson, Greene and Gordon, 495) is the local inhibition of plant growth by another plant by *Duroia hirsuta*. This is also believed to be the cause of the formation of the "devil's gardens" as indicated in the previous studies on mutualism between the *Duroia hirsuta* and *Myrmelachista schumanni*. There are two different hypotheses to explain the formation of 'devil's gardens' One testable hypothesis is that the formation of 'devil's gardens' involves ants, independent of allelopathy. Consider this hypothesis here, and fill in this chart with your predictions about damage to cedar saplings, put yes or no in each of the boxes in the table.

Hypothesis 1: *M. schumanni* ant defense keeps other plants out of the garden by increasing leaf damage to cedar saplings. Null hypothesis; There is no relationship between the presence of ants and the amount of leaf damage to cedar saplings. Predictions Under

Hypothesis 1 Will leaf damage occur if ants are excluded? Will leaf loss occur if ants are not excluded? Cedar saplings planted inside the garden (ants present) A No B No Cedar saplings planted outside the garden (ants not present) C No D No

1. An alternate testable hypothesis is that *Duroia* (the genus of tree in the study) allelopathy accounts for the formation of 'devil's gardens', independent of ant defense. Consider hypothesis 2 here, and fill in the table with your predictions about leaf damage to cedar saplings, put yes or no in each of the boxes in the table.

Hypothesis 2: *D. hirsuta* tree allelopathy keeps other plants out of the garden by increasing leaf damage to cedar (other tree species') saplings. Null Hypothesis (fill in the blank): There is no relationship between the *D. hirsuta* allelopathy and the amount of leaf damage to cedar (other tree species') saplings. Predictions Under Hypothesis 2 Will leaf damage occur if ants are excluded? Will leaf loss occur if ants are not excluded? Cedar saplings planted inside the garden (ants present) A Yes B Yes Cedar saplings planted outside the garden (ants not present) C No D No

5. Draw a bar graph representing the predicted outcome of Hypothesis 2 (you can make the bar size relative to the other bars to illustrate the findings from your data table above). Label all the axes and state what each of the bars represents.

Legend: Y1 = cedar saplings planted inside the garden with ants
 2 = cedar saplings planted inside the garden without ants
 3 = cedar saplings planted

outside the garden with ants⁴ = cedar saplings planted outside the garden
without ants^X 0-10 = No¹¹⁻³⁰ = Yes

6. Actual experimental results allow you to reject hypothesis 2 but do not
“ prove” hypothesis 1. How did they test whether leaf damage was
caused by formic acid?

First, they did an ant- exclusion experiment to determine whether the selective killing of plants inside the devil’s garden was due to the activity of the *M. schumanni* or to the allelopathy by the *D. hirsuta*. Then, through chemical analysis, which proved that the poison glands of *M. schumanni* contain formic acid, they detected no other compounds. They also treat leaves with formic acid which resulted in induced necrosis on all the leaves they tested. First, they did an ant- exclusion experiment to determine whether the selective killing of plants inside the devil’s garden was due to the activity of the *M. schumanni* or to the allelopathy by the *D. hirsuta*. Then, through chemical analysis, which proved that the poison glands of *M. schumanni* contain formic acid, they detected no other compounds. They also treat leaves with formic acid which resulted in induced necrosis on all the leaves they tested.