**The Shannon Biodiversity Index of Soup Bean Mix**

Background: The Shannon Index is a measurement used to compare diversity between habitat samples. This comparison can be between two different habitats or a comparison of one habitat over time. The actual formula for the Shannon-Weiner Diversity Index is:

* S = Total species
* Pi = Percentage of that species out of the total
* ln = Natural log
* Ʃ = Sum
* i = individual species
* E which is the evenness of those species. If the E value is 1, the species are equally present in the habitat.
* The formula to find E is: E = H/ln(S).

High values of H would be representative of more diverse communities. If the species are evenly distributed then the H value would be high. So the H value allows us to know not only the number of species but how the abundance of the species is distributed among all the species in the community.

Procedure:

* In team of 2, fill a cup with bean mix 1 and another cup with bean mix 2. Each cup represents plants from two different habitats
* Mark your cups so you know which cup is from which “habitat”.
* Fill in the charts for each “habitat” using **Shannon’s Diversity Index.**
* Calculate the **Evenness** of each “habitat” as well.

|  |
| --- |
| **HABITAT NAME:** |
| Species (i) | Number of that species in sample | Pi (number of that species/total) | ln(Pi) | Pi \*ln(Pi) |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  Total from all species | Should add up to 1.0 | Use the natural log table | Ʃ H = (remove the -) |

**Diversity index for “Habitat 1”: H =**

**Evenness for “Habitat 1”: E = H/ln(S) =**

|  |
| --- |
| **HABITAT NAME:** |
| Species (i) | Number of that species in sample | Pi (number of that species/total) | ln(Pi) | Pi \*ln(Pi) |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  Total from all species | Should add up to 1.0 | Use the natural log table | Ʃ H = (remove the -) |

**Diversity index for “Habitat 1”: H =**

**Evenness for “Habitat 1”: E = H/ln(S) =**

Questions:

1. Looking at the two habitats, what do you think would happen to the H value if you took a second sample from this habitat five years from now.

2. Compare and describe the H value of the two habitats.

3. Compare and describe the E value of each habitat. 5

4. Is there a connection or correlation between both the H and E values of each habitat?

5. Discuss the differences between species richness and species abundance.

6. Discuss the type of community that has a H value of zero… what would this represent?

7. Do an internet search what is the highest Shannon Index value you are able to find and where is it located.