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Section: BS Data Science
Course: Advance Statistics

Assignment # 3

Diversity Index:

Shannon Index:

Calculate total no of individuals

$P_{oak} = 50$
$P_m = 30$
$A_B = 15$
$P_P = 5$

$(N) = 50 + 30 + 15 + 5 = 100$

Now calculate propotions of each species

$P_{oak} = \frac{5}{100} = 0.50$

$P_m = \frac{30}{100} = 0.30$

$P_B = \frac{15}{100} = 0.15$

$P_P = \frac{5}{100} = 0.05$

Now calculate natural log (ln)

$\ln(0.50) = -0.693$
$\ln(0.30) = -1.204$
$\ln(0.15) = -1.897$
$\ln(0.05) = -2.996$

Date: Day:

Multiply both calculations.

Oak = 0.50 x -0.643 = -0.3465
maple = 0.30 x -1.204 = -0.3612
Birch = 0.15 x -1.897 = -0.2846
Pine = 0.05 x -2.996 = -0.1498

Sum all values

(-0.3465) + (-0.3612) + (-0.2846) + (-0.1498)
= -1.1421

Shannon Index = $-\Sigma(P_i * \ln(P_i))$

= -(-1.1421)
= 1.1421

Refrence:

Magurran, A. E (2004) Measuring Biological diversity Blackwell publishing problem in Chp 21

Date: Day:

Berger Parker Index:

It is a simple measure of diminance. It is the proportion of the total sample that is made up the most abundent species.

A = 80
B = 15
C = 5

No-max = 80 (species A)
Total idiviales = 100

$$B\cdot P\cdot I = \frac{No\text{-}max}{N} = \frac{80}{100} = 0.8$$

80% of grassland community is S.A

Refrence:

Magurran, A.F (2004) Measuring Biological Diversity problem in Chapter 2.

Date: Day:

Simpson's Index

Simpson's index $= \Sigma p_i^2$

first find square of individuals

$P_{oak} = (0.8)^2 = 0.25$

$P_m = (0.3)^2 = 0.09$

$P_B = (0.15)^2 = 0.0225$

$P_p = (0.05)^2 = 0.0025$

$S.I = \Sigma p_i^2 = 0.25 + 0.09 + 0.0225 + 0.0025$

$= 0.365$

Refrence:

Krebs, C.J (2014)
Ecological Methodology (3rd Ed)
problem in chp 9.

Date: Day:

Margalef's Index:

It is a simple way to quantity species richness.

M.I $\frac{(S-1)}{\text{Index}}$

Sample A = $\frac{15-1}{\ln(\omega)}$ = 3.04

Sample B = $\frac{15-1}{\ln(100)}$ = 2.03

Refrence:

Krebs C.J (2014) Ecological Methodology (3rd Ed)

Date: Day:

Gini Simpons Index:

1 - D

ginisimpons 1 - 0.365 = 0.635

This means 63.5% of chance that two randomly picted trees are from diffferents species.

References:

Jost L (2006) Entropy and diversity problem in Chapter 9