

5.2 lab calculations

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1 Dominance - D

1. Teacher lot:

$$D_A = \frac{6}{54} \quad (1)$$

2. Student lot:

$$D_B = \frac{6}{66} \quad (1)$$

2 Species richness - R

Number of types of vehicles – Types of cars not in the parking lot

1. Teacher lot:

$$R = 41 - 15 = 26 \quad (1)$$

2. Student lot:

$$R = 41 - 8 = 33 \quad (1)$$

3 Shannon-Wiener Index - H

1. Teacher lot (Honda SUV):

$$H = \sum (P_i \ln[P_i]) \quad (1)$$

$$P_i = 5 \quad (2)$$

$$N = 54 \quad (3)$$

$$P_i = \frac{n_i}{N} = \frac{5}{54} \quad (4)$$

$$H = - \sum_{i=1}^{26} \frac{5}{54} \ln \frac{5}{54} = 5.7 \quad (5)$$

2. Student lot (Subaru car):

$$H = - \sum (P_i \ln[P_i]) \quad (1)$$

$$P_i = 5 \quad (2)$$

$$N = 66 \quad (3)$$

$$P_i = \frac{n_i}{N} = \frac{5}{66} \quad (4)$$

$$H = - \sum_{i=1}^{33} \frac{5}{66} \ln \frac{5}{66} = 6.5 \quad (5)$$

4 Species Evenness - E

1. Teacher lot:

$$E = \frac{H}{\ln(R)} \quad (1)$$

$$= \frac{5.7}{\ln(26)} = 1.75 \quad (2)$$

2. Student lot:

$$E = \frac{H}{\ln(R)} \quad (1)$$

$$= \frac{6.5}{\ln(33)} = 1.86 \quad (2)$$

(a)

$$1950 : \frac{5.2 \cdot 10^{10} \text{kg}}{2.6 \cdot 10^9 \text{people}} = 20 \text{ meat kg per capita} \quad (1)$$

$$2000 : \frac{2.4 \cdot 10^{11} \text{kg}}{6 \cdot 10^9 \text{people}} = 40 \text{ meat kg per capita} \quad (2)$$

$$\frac{40 \text{kg}}{20 \text{kg}} = 2 \Rightarrow 100\% \text{ increase} \quad (3)$$