

Population ecology – dandelions essay sample

[Sociology](#), [Population](#)



Introduction

Succession is the process of the development of a sequence of communities over a period of time. There are many methods that are used in ecology to measure the population of a species. Collection of data in the case of immobile (stationary) species, such as the population of plants being studied for this investigation, was collected using line transects. These are analysis methods across a representative part of the habitat, along which quadrats are laid to cover a certain area for collecting population data. The dandelion population being studied is located in the school's soccer field, where some plants have been tempered with, due to mowing and excrements left by another species. Also, human impact (students that play in the fields) has also affected the growth of the population in various places.

Variables

Controlled - The size of the circular quadrat, meaning the hula-hoop, the day for the experiment, and the distance between each quadrat.

Independent - The initial positioning of the quadrat from the base line (first quadrat) in the field.

Dependant - The number of dandelion plants in each quadrat.

Hypothesis

As quadrats move away from the base line, i. e. towards the fence widthwise, and away from the portables lengthwise, the dandelion plant population will increase.

Materials

- 1 Hula-hoop (90 cm in diameter)
- Ruler
- Meter stick

Method

- Place the quadrat along the line transect specified by the instructor, initially at the base line. Align the quadrat with the flags placed at each corner of the habitat section being studied.
- Count and record the amount of dandelion plants (hubs) present in the quadrat. Make sure each person has taken the job of counting the plants.
- Move in the direction of the fence, and after completing data collection in the quadrat; leave a constant distance of 5 steps between each successive quadrat. This will allow for better representation of the population.
- After reaching the endpoint of one line transect, have the next base line another 5 steps to the left side, and continue counting.
- Continue this pattern of placing quadrats and counting along the 75 meters of fencing and 50 meters of line transect.

Qualitative Observations:

During the investigation, it was observed that many locations in the transect contained animal excretions, while others did not. The locations with this entity had plants that were smaller than the locations without this entity.

Data Processing and Calculations

Calculations involving individual data: (Using Table 1)

Average Number of Dandelion Plants = 20.1 dandelion plants/quadrat

Area of Quadrat

Uncertainty

Area of hula-hoop =

$$= (0.45 \pm 0.01\text{m})^2$$

$$= 0.2025 \pm 0.009\text{m}^2$$

$$= (0.2025 \pm 0.009)$$

$$= 0.2025 \pm 0.009\text{m}^2$$

Area of Transect (Football field)

Uncertainty

$$= \text{length} * \text{width}$$

$$= 75\text{m} \pm 1\text{m} * 50\text{m} \pm 1\text{m}$$

$$= 3750 \pm 125\text{m}^2$$

$$= (3750$$

$$= 125\text{m}^2$$

Average Population Density

Uncertainty

$$= 31.44 \pm 2.97 \text{ dandelion plants/m}^2$$

$$= (31$$

$$= 2.97 \text{ dandelion plants/m}^2$$

Estimation of dandelion plant population in the transect

Uncertainty

$$= \text{average population density} * \text{area of transect}$$

$$= 31.44 \pm 2.97 * 3750 \text{ 125m}^2$$

$$= 117900 \pm 15068 \text{ dandelion plants/transect}$$

$$= (117900$$

$$= 15068 \text{ dandelion plants/transect}$$

Calculations involving class data (Using Table 2):

Table 3: Calculated values for data collected from the class

Group number

Average Population Density (Dandelion plants/m²)

Estimation of dandelion plant population in the transect (class data)

Average Population Density of Class

Total Population Size

=

=

= 31.14 ± 2.86 dandelion plants/m²

= Average Population Density of Class * area of transect

= 31.14 ± 2.86 * 3750 ± 125

= 116775 ± 14618 dandelion plants/transect

In order to visualize the trends or patterns in the population of dandelion plants as the investigation progressed, the following graphs were constructed using Excel 2007:

Graph 1: Dandelion plant population (own data)

Graph 2: Average dandelion plant population (class data)

Discussion and Conclusion

As it can be observed from the total dandelion plant population numbers, and from the graphs, there is a trend in the growth pattern of dandelion

plants. Graph 1 states that as the number of quadrats increase, the number of dandelion plants also increases with regular fluctuation, and peaks at the last quadrat. This implies that as the quadrats get placed farther away from the portables and closer to the fence, the dandelion population increases, thus proving the hypothesis right. However, Graph 2, for the most part has data decreasing in the direction mentioned, but increasing during the last few quadrats, away from the portables and towards the fence. The “fluctuation of data” may have occurred due to the animal excrements left on the field, which stop the proper growth of plants. Also, human actions, such as walking on the fields and mowing explain the overall trend, especially near portables and the base line. The estimated population from own data, 117900 15068, and class data, 116775 14618 dandelion plants/transect, signify the fairly preciseness of the results of this investigation.

Factors that may have affected the outcome of this investigation may have been the steps taken between each successive quadrat along the transect. This is because when taking steps, some of them were uneven, or did not cover as much ground when walking, which may have resulted in the wrong placement of the quadrat, thus threatening fair representation of the population in the field. Another aspect may have been walking in a straight line towards the fence. Some members deviated from the straight path that they were supposed to follow for best representation of data, which may have caused slight variant results. Also, since this data was shared within the group, the counting of the population by different members may have created the chance of a differing bias, thus keeping the data inconsistent. The counting of the plant can be difficult due to the way the plant grows in

the field, overlapping other dandelion plants. This may also have been the reason to the fluctuations shown in Graph 1, not only due to the excrement and student footsteps in various parts of the field.

If this investigation were to be performed again, the steps taken between each successive quadrat should be thoroughly measured with a ruler or tape measure, and then placed, rather than walking 5 steps, which leaves room for huge error. If one wants better representation of data, this is mandatory. When moving towards the fence and away from the base line, one should either look straight ahead and walk in order to stay in the same line transect. Alternatively, the fields could have been marked with lines representing the transects and even the positions of the quadrats, which would have drastically boosted the accuracy and precision of the investigation. Also, if the data is to be shared within the group, then in order to stay consistent, there should be one counter for all the quadrats, removing any discrepancies. These are various ways that the data collection method proves to be very weak and inconsistent.