Inside of Owdijtown there is a small population of Koala bears. These bears eat only one specific type of tree, the Eucalyptus. This creates a special relationship between the two. Since it is often hard to track the bears themselves due to their reclusive and solitary nature, researchers often will sample the trees to be able to understand how stable the Koalas habitat is.

**Another Hardy Weinberg Problem**

In the Eucalyptus tree genome there is a gene that controls leaf size. A double recessive gene means that tree leaves will be much larger than normal. This means that there will be a better chance the koala population will be able to eat on any given year. Scientists have wondered how to cultivate more big leaves within the Eucalyptus population to help feed the Koalas.

The problem is that there has been an invasion of foreign beetles that have been devouring the large leaf Eucalyptus plants. The beetles are attracted to the large leaved trees because they are an ample food source. The beetles have been eating both small leaved trees and large leaved trees, but the large leaved trees have been targeted in much larger numbers. The affected trees lose many leaves and do not provide as much food.

**Hypothesis:**

Understanding the population parameters and situation, come up with a hypothesis below that reflects the Koala population in Owdijtown. Come up with a hypothesis that shows how you might understand the population over the next few years.

**Data:**

Over the last few years the researchers in Owdijtown have been tracking the population of Koalas. Their data and findings can be seen in Figure 1.1, Figure 1.2 and Figure 1.3.

Figure 1.1 – Year 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Small Leaf Trees | Number of Small Leaf Trees Affected by Beetles | Number of Large Leaf Trees | Number of Large Leaf Trees Affected by Beetles | Estimated Koala Population |
| 49 | 4 | 16 | 3 | 25 |

Figure 1.2 – Year 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Small Leaf Trees | Number of Small Leaf Trees Affected by Beetles | Number of Large Leaf Trees | Number of Large Leaf Trees Affected by Beetles | Estimated Koala Population |
| 47 | 4 | 12 | 4 | 21 |

Figure 1.3 – Year 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Small Leaf Trees | Number of Small Leaf Trees Affected by Beetles | Number of Large Leaf Trees | Number of Large Leaf Trees Affected by Beetles | Estimated Koala Population |
| 45 | 4 | 9 | 3 | 18 |

**Data Analysis:**

Answer the following questions. These will help you analyze the data and be able to draw valid conclusions.

1. How do the Koala population and the Eucalyptus population mathematically relate over time in the study?
2. Are the allele frequencies of the population of Eucalyptus trees changing over time? If so, how are they changing?
3. Do you expect to have more or less Koalas in the fourth year of the study?

**Conclusion:**

Use the space below to come up with a conclusion about the Koala population.