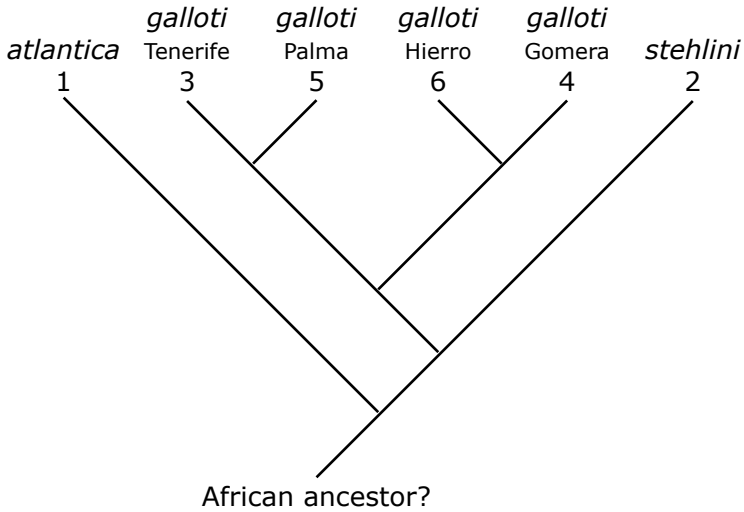


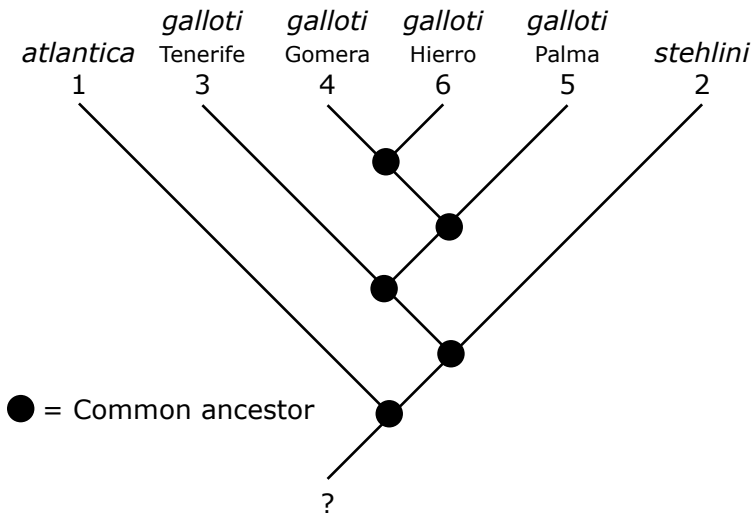
Phylogeny solutions

The information that follows is intended as a guide to solutions to the phylogenies based on different types of data. These are my interpretations and are by no means definitive.

At left is one possible solution **based on geographical distance and island hopping**. It does not take into account actual currents which vary over time. There can be other reasonable solutions. The idea here is to get the student thinking about the logic of the problem, not its ultimate answer. The numbers indicate the chronological sequence.



At left is a possible solution **using island distribution and morphology**. In using body size, one is tempted to guess that medium lizards of Palma could have been the immediate ancestors to Gomera, and the small lizards of Gomera are ancestors to the small lizards of Hierro. This could contradict the argument based on distance. Again there is no one perfect answer. Ecologists and geneticists have debated several hypotheses for years. Numbers imply chronology.



The solution at left **uses DNA evidence** from Table 2 to deduce genetic distance. It is considered the most reliable criterion to establish evolutionary kinship. Since all base pairs have an equal chance for mutation and mutation rate is relatively constant even though evolution rate is not. Note that north and south Tenerife populations are listed as one. Either may be a source for new colonization. The real surprise here is not the evolution of the smaller forms, it is that *stehlini* on Gran Canaria appears to have the oldest ancestry although *atlantica* is actually closer to Africa. This unexpected surprise could support the hypothesis that the *Gallotia* lizard ancestor is European! As an extension, have students investigate the currents along the Portugal coast.

