## PLANT CONNECTIONS: CREATING PHYLOGENETIC TREES

The relationships between different plants can be analyzed with genetics. The similarities or differences in their genetic codes can help us to understand the links between each plant.

Understanding these relationships allows us to build a "family tree" that charts the connections between them. This chart is called a *phylogenetic tree*.

Phylogenetic trees often use scientific names for the species they include. Scientific names are composed of a genus (a group of very closely related plants) and species (the specific type of plant). Some examples of scientific names for common edible plants include:

Tomato: Lycopersicon esculentum

Carrot: Daucus carota

Apple: Pyrus malus

Potato: Solanum tuberosum

We're going to use some online tools to create a phylogenetic tree, which will show us which plants are most closely related. Let's start at phyloT, an online program that generates phylogenetic tree:

https://phylot.biobyte.de/

In the *Search Taxonomy* box, enter the scientific name of each examples above. After each entry, you'll see an ID number for that plant appear inside the *Tree Elements* box. Once you've entered all of the examples, click on the *Visualize in iTOL* button.



Does your result look like this?



Looking at this phylogenetic tree, which species are most closely related? Which species is most distant from the others? Do these relationships make sense based on how the plants look?

## Extender Activity:

Look up the scientific names for any set of plants you choose, and create a phylogenetic tree using the phyloT tool. Which are most closely related?

Add some non-plant species. Try including some pollinators like honey bees (*Apis mellifera*), common animals like cats (*Felis catus*), and even humans (*Homo sapiens*). What does the resulting tree look like? Are different species related in the ways you expected? Are there any surprising connections?

