

The Phylogeny of *Lonicera Fragrantissima*

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Abstract

Lonicera Fragrantissima is an unbarcoded species. Barcoding will allow scientists to identify the species as well as make comparisons among other species. Through this experiment, a novel sequence of *Lonicera Fragrantissima* was discovered. We are currently in the process of publishing this study to GenBank, and have been provided with a manuscript number.

Introduction

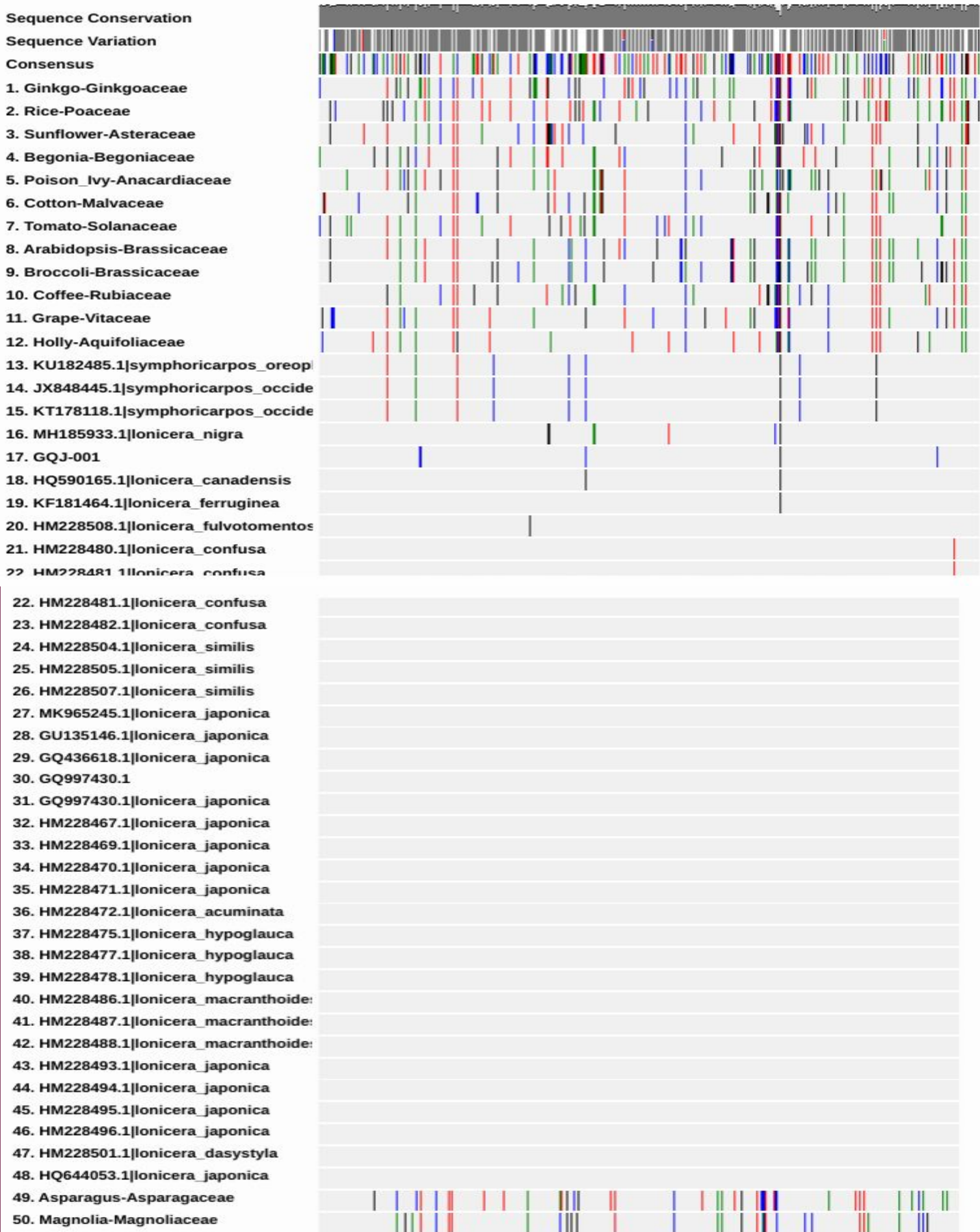
Lonicera Fragrantissima is a species of the *Caprifoliaceae*, family. The *Lonicera* family is known specifically for its ability to reduce inflammation and digestive disorders. This plant can be used to reduce inflammations caused by headaches, diabetes, arthritis, and urinary disorders. Studies show that the *Lonicera* is very high in disease-fighting antioxidants. The plant is said to act as an immunomodulatory agent that helps to produce natural killer cells, white blood cells, specifically lymphocytes, that have the ability to kill viruses. As a part of this *Caprifoliaceae* family, we hypothesize *Lonicera Fragrantissima* also hosts a multitude of medicinal properties.

Methods & Materials

- Extract DNA from *Lonicera Fragrantissima* leaf sample.
- Perform PCR replication and amplification
- Upload results on blue line of DNA Subway.
- Use MUSCLE BLAST Alignment to analyze differences between consensus sequence and *Lonicera Fragrantissima*. Find that *Lonicera Fragrantissima* is not the consensus.
- Use phylogenetic trees ML and NJ to analyze evolutionary relationships and common ancestors.

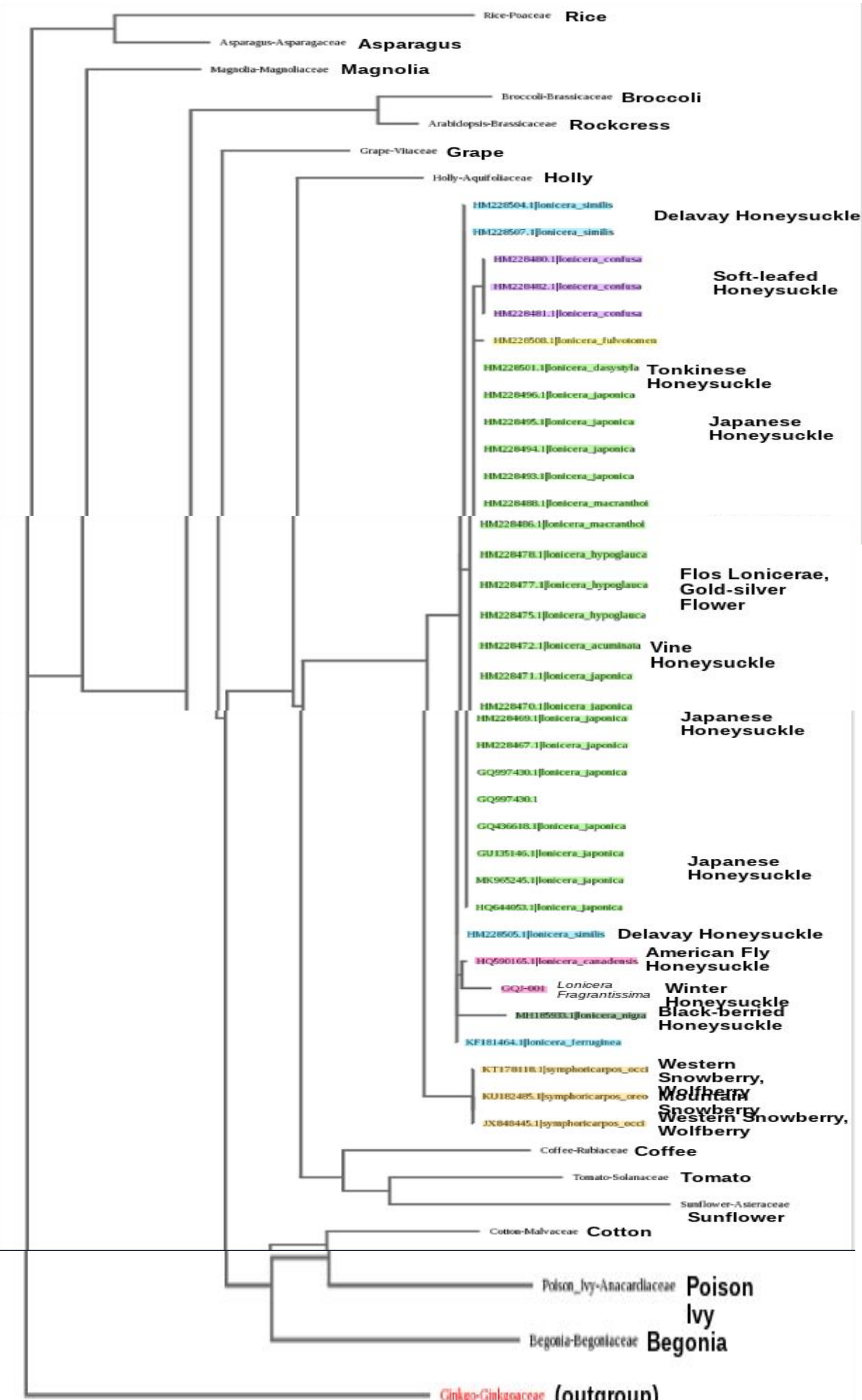
Results

Figure 1: MUSCLE Alignment



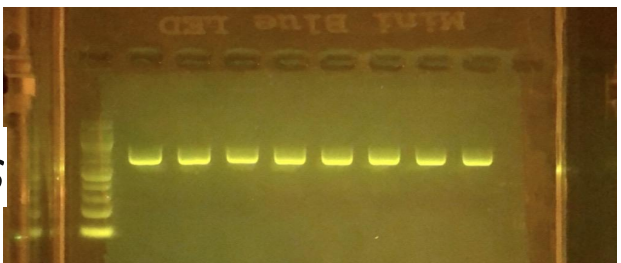
The consensus sequence is derived from aligning all of the sequences of the species and determining the most frequent nucleotide similarities. On the alignment, the consensus is indicated by the light grey space. The MUSCLE alignment shows that there are many species in the data that are under the same consensus sequence because they share all of the same nucleotides. The colored bars indicate the location of the sequence where a species has a different nucleotide from the consensus, while the grey bars show the nucleotides that are the same as the consensus. Adenine is shown in green, thymine is shown in red, cytosine is shown in blue, and guanine is shown in black. *Lonicera Canadensis* and *Lonicera Nigra* share many of the same nucleotide bases as *Lonicera Fragrantissima*, so they are closely related to it. The presence of the consensus sequence is most likely due to the plants with the consensus sequence having the same genus- *Lonicera*.

Figure 2: Phylogenetic Tree ML



Some plants, such as the *Lonicera Japonica*, appear multiple times on the alignment chart and the phylogenetic trees because there are multiple specimens within the species of plant. For example, within the *Lonicera Japonica* is the *Lonicera Japonica* var. *Chinensis*. According to the alignment chart they share exact nucleotides, which is why they are present on the same branch under the general name of *Lonicera Japonica*.

The results of the gel show the close relation to the samples



Discussion

The hypothesis of this study was that barcoding the species *Lonicera Fragrantissima* can lead to important scientific discoveries by learning new properties about the species and comparing it to other species. The gaps in understanding in this study are related to the definitive presence of these medicinal properties, as well as the presence of saponins and caffeine in the tea of *Lonicera Fragrantissima*. Medicinal properties of the closely related *Lonicera Japonica* have been, widely researched .The nucleotide bases of *Lonicera Japonica* on the alignment were regarded by DNA Subway as the consensus sequence, as earlier stated. In the analysis of the MUSCLE chart, it is noted that few nucleotides differ between the consensus sequence and *Lonicera Fragrantissima* sequence. The two plants that *Lonicera Fragrantissima* shared the most nucleotides with on the alignment, *Lonicera Nigra* and *Lonicera Canadensis*, are also noted to share the medicinal properties of *Lonicera Japonica*. With the presence of the MUSCLE chart and the phylogenetic tree, close phylogeny may suggest that these medicinal properties are shared.

References

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