



Comparative Phylogeny of *Abutilon Hybridum* and *Abutilon Megapotacium*



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Abstract

The *Abutilon Megapotacium* and *Abutilon Hybridum* are species of the *Malvaceae* Family, indigenous to South America. The purpose of this project was to compare the phylogeny of these species and the complementary base pairs. A manuscript number was received from GenBank and is in the process of being published.

Introduction

Two plant species that have never been barcoded before are the *Abutilon Hybridum* and *Abutilon Megapotacium*, which are both members of the *Malvaceae* family. Within this family, *Abutilon* tribe is the most abundant and contains over 400 species. *Abutilon hybridum* is commonly known as the “flowering maple” and is known to originate in South America.

Past Studies

ABUTILON HYBRIDUM ECUADOR 2016

- Scientists observed a diseased *Abutilon Hybridum* with bright yellow mosaic symptoms including infected leaves. The symptoms included infected leaves mottled with bright yellow and green.
- The study described the *Abutilon hybridum* as, “*Abutilon hybridum* showing bright yellow mosaic symptoms were observed in gardens in Tumbaco, Ecuador. The infection was confirmed by Polymerase Chain Reaction (PCR) using degenerate begomovirus primers” (Yeturu, Jentszsch, et al. 60-74).

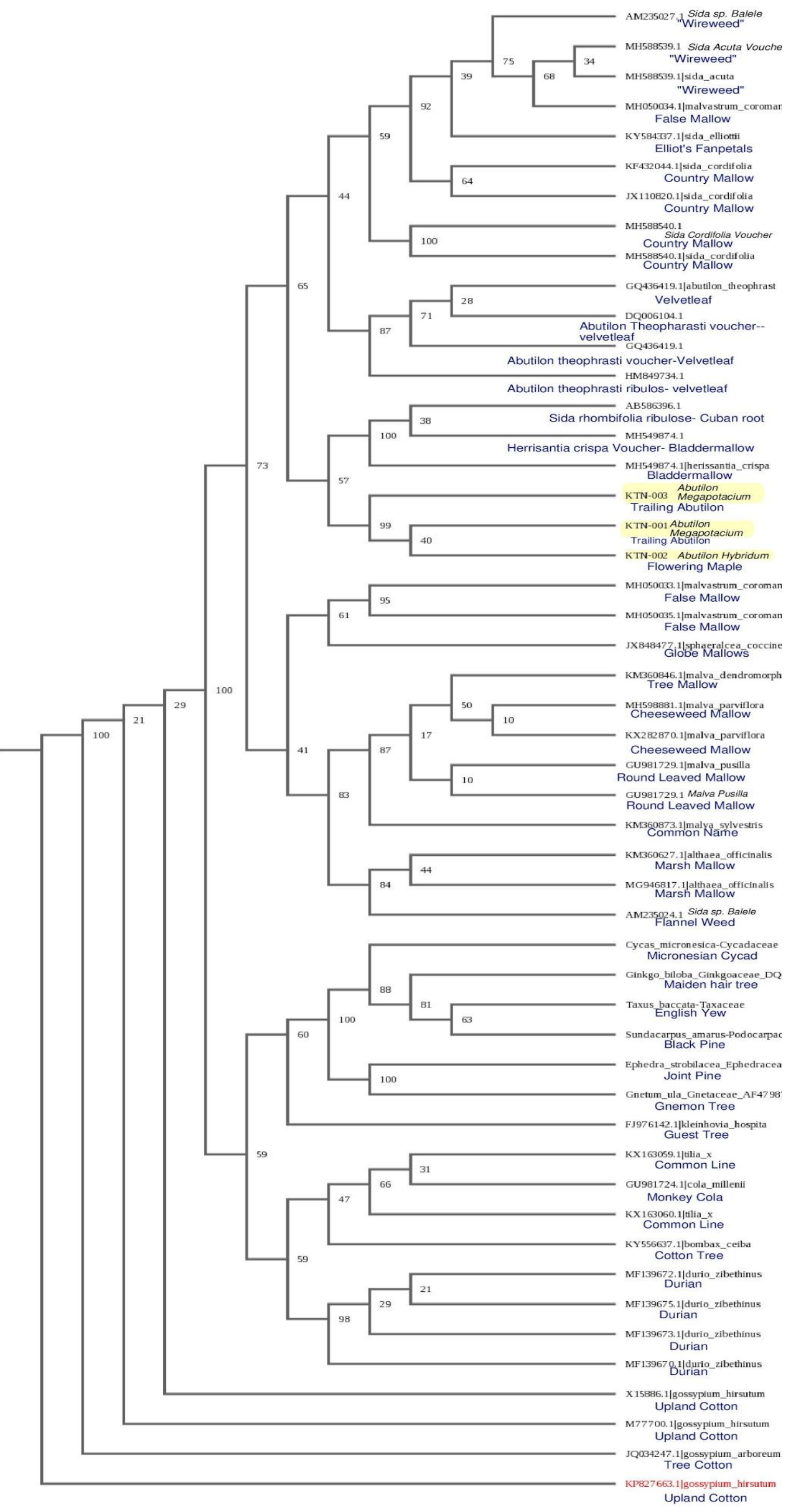
ABUTILON MEGAPOTACIUM IN CHINA 2010

- A diseased *Abutilon Megapotacium* in was observed with dark brown concentric spots on leaves, in a controlled greenhouse. This was the first record of *Myrothecium Roridum* present on a species of the *Malvaceae* family.

Materials & Methods

- Samples were obtained from both the New York Botanical Garden and the EEB Greenhouse at UCONN University
- The DNA was isolated and run through PCR and then sent out for sequencing
- A phylogenetic tree was generated using MUSCLE on DNA Subway

Figure 1: Our phylogenetic tree shows the *Abutilon Hybridum* and *Abutilon Megapotacium* highlighted and its genetic relation to other species. The samples are labeled as KTN- 001 and 003 represent *Abutilon Megapotacium* and KTN-002 represents *Abutilon Hybridum*

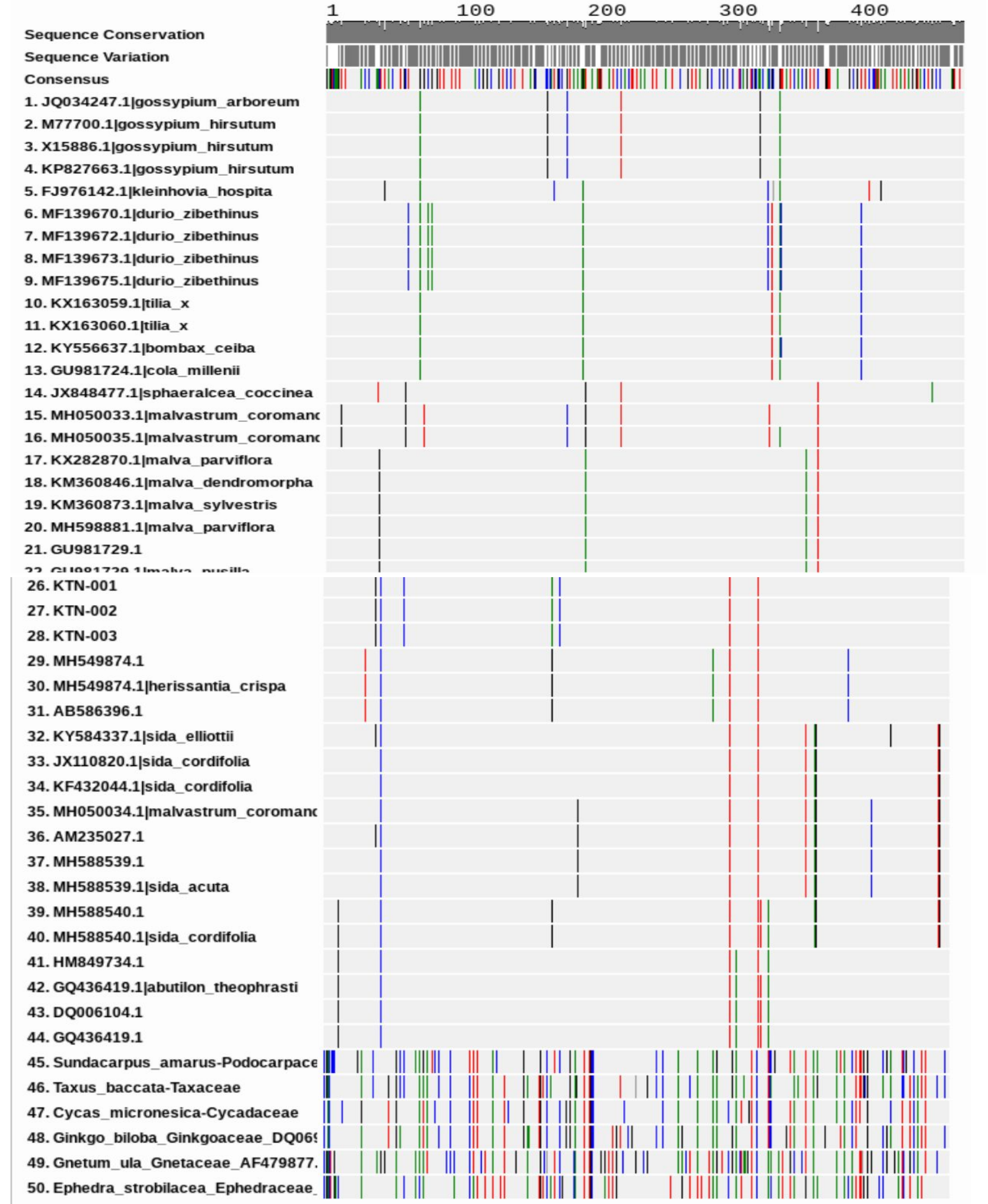


Results

This experiment, a consensus sequence was found labeled as the Consensus sequence in Figure 1 below. Organisms 23 to 44 share the same difference in the thymine base compared to the consensus sequence. The findings showed an approximately close relation to Durian, *Durio Zibethinus*. Durian is widely popular for its creamy consistency and odor but also its nutritional values, especially in Asian countries. The fruit is rich in vitamin C and potassium. It can help improve muscle strength, skin health including appearance and elasticity and is a holistic way to help lower blood pressure. It may seem like a supreme fruit however it does have to be consumed in moderation. The MUSCLE chart shows that the Durian, *Abutilon Megapotacium*, and *Abutilon Hybridum* all share a common difference compared to the Consensus Sequence. The C base pair is present in the previously mentioned species showing a slight correlation in the plants. This proves that there are possible medicinal properties found in both *Abutilon Megapotacium* and *Abutilon Hybridum*.

Tables and Figures

Figure 2: as shown above represents the MUSCLE Chart generated from the sequencing results. Each line represents a nucleotide base, organized by color. The lines represent differences in each species’ sequence compared to that of the consensus sequence. Species numbered 45- 50 are seen to have the most differences compared to the consensus sequence as they have the farthest relationship to the *Abutilon Hybridum* and *Abutilon Megapotacium*.



Discussion

The phylogenetic tree proved a close relationship between both samples. The base pairs vary between species but, according to the MUSCLE sequence, the two plants share the same cytosine base and are followed by 18 more sequences of that base from other similar plants.

In order to barcode the species of *Abutilon Megapotacium* and *Abutilon hybridum* it is necessary to extract the DNA from each of the species. By crushing the leaves of both species the DNA can be isolated using a lysis solution as detailed in Section 2 above. The isolated DNA is then run through PCR in a thermal cyclor which replicated the DNA strands. Following the PCR, the samples were run in gel electrophoresis to visualize the band patterns of each species’s sample to compare. The samples had identical band patterns further proving a close relationship between *Abutilon Megapotacium* and *Abutilon Hybridum*.

One of the major findings from this experiment was an unexpectedly close relationship between *Abutilon Hybridum* and *Abutilon Megapotacium* and *Durio Zibethinus*. Therefore, using *Abutilon Hybridum* and *Abutilon Megapotacium* instead of Durian could enable a vitamin or treatment to contain the same medicinal properties and benefits as Durian, without containing the potent smell. Durian also comes at a high cost, where by using the newly barcoded plants, producing a pill would be more cost efficient. A scientific study would further need to be conducted, but the leaves could possibly be dried and then crushed into a fine powder. The powder would then be placed in a plant-based capsule for easy digestion.

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