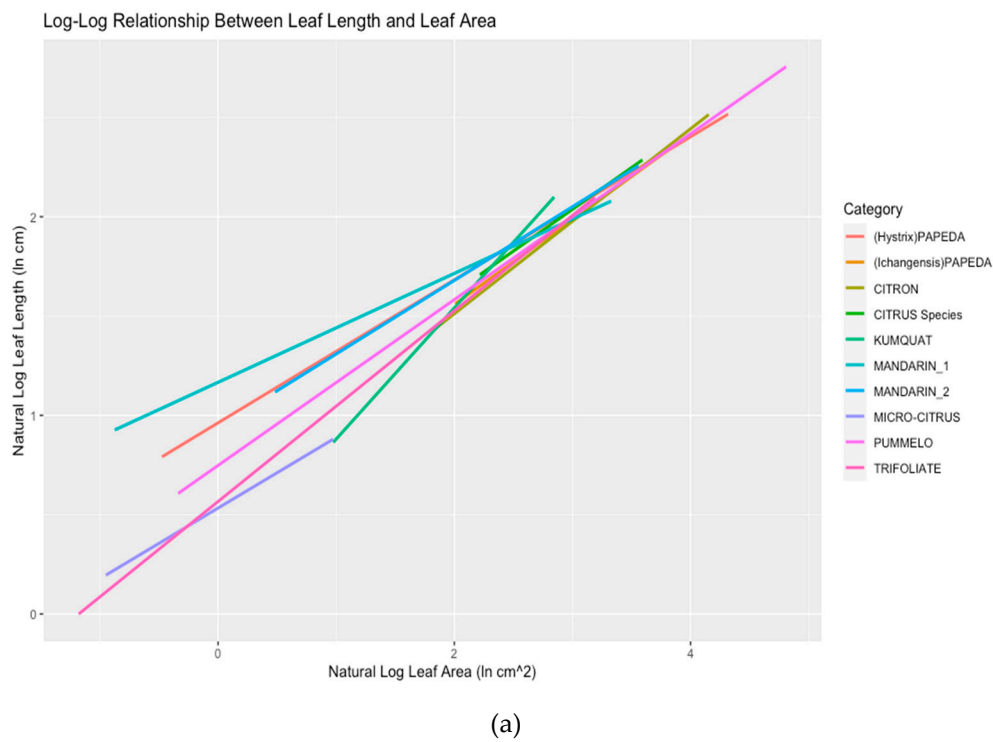
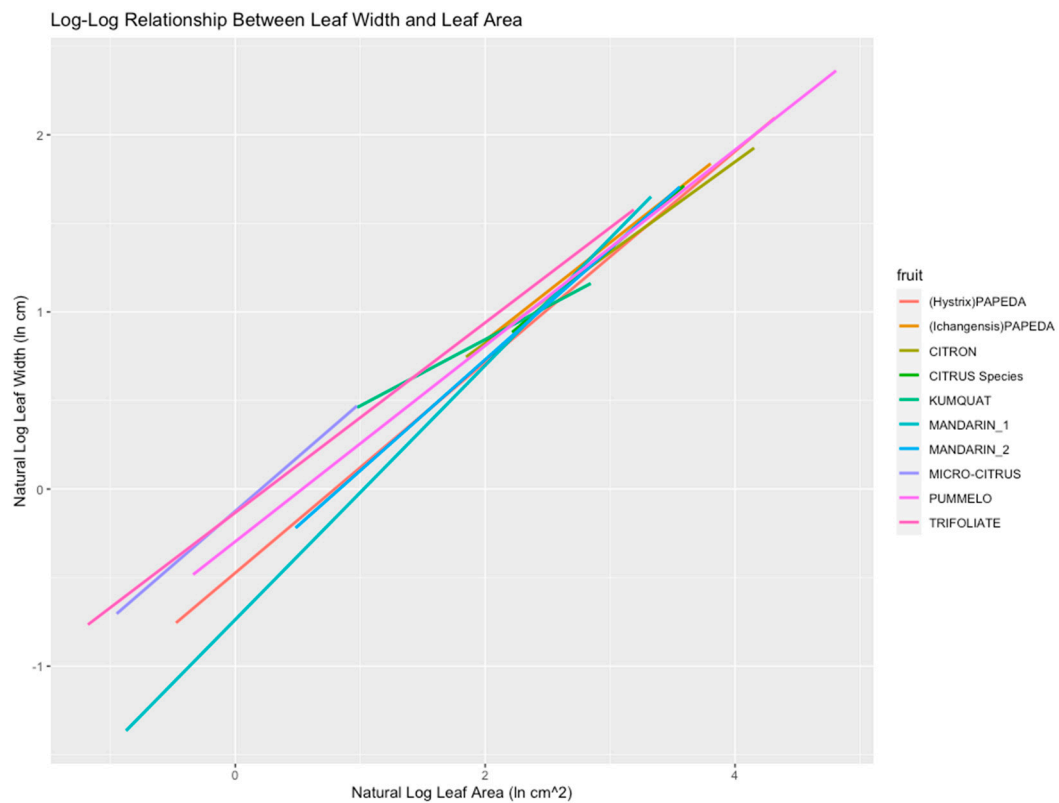


Exploring the Phylogenetic Relationship among Citrus through Leaf Shape Traits: A Morphological Study on Citrus Leaves

Ryan C. Traband, Xuesong Wang, Jill Lui, Lei Yu, Yoko Hiraoka, Ira A. Herniter, Christian Bowman, Mariano Resendiz, Zixian Wang, Sara P. Knowles, Sassoum Lo, Daniel H. Chitwood, Louis Santiago, Tracy Kahn, Danelle Seymour, Mikeal L. Roose, John M. Chater and Zhenyu Jia

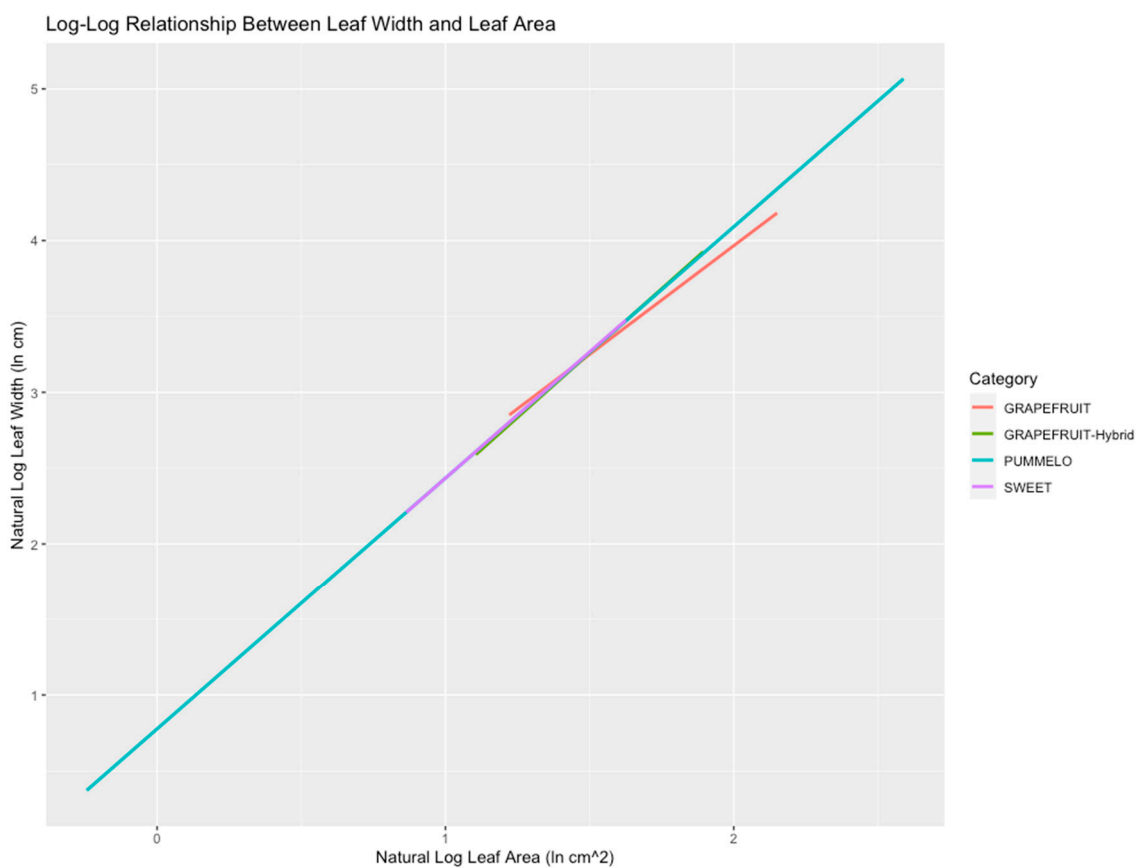
Supplementary Figures



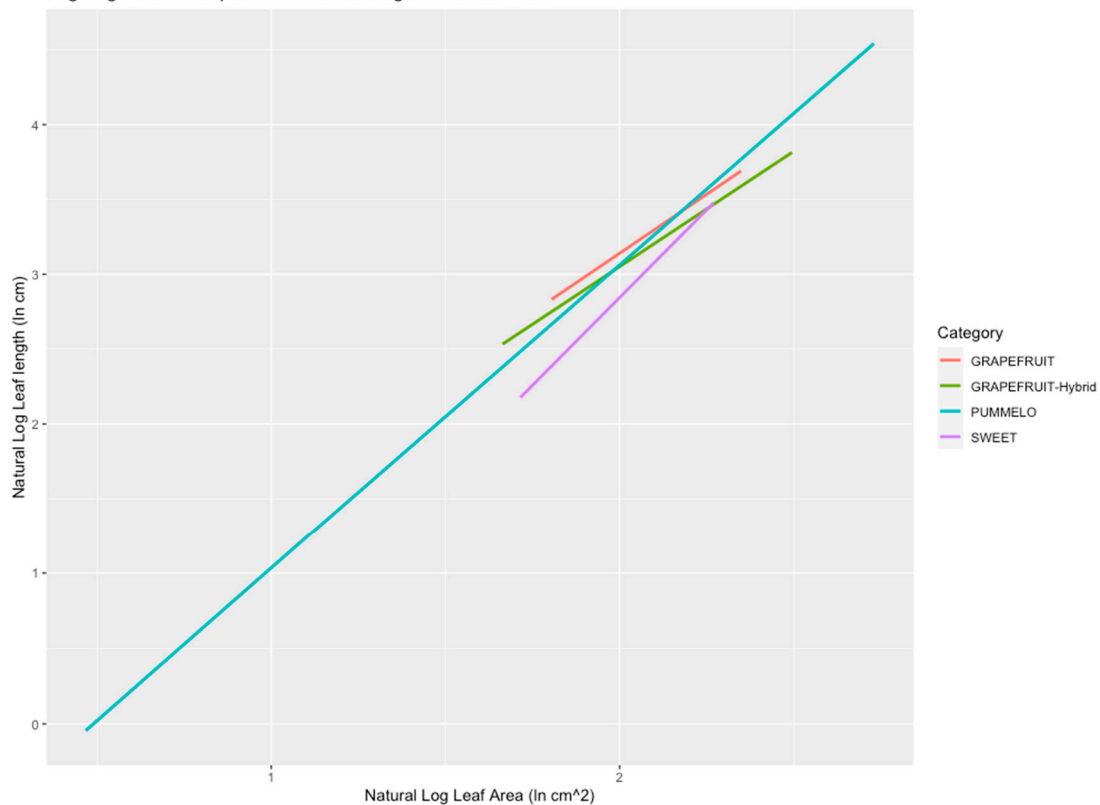


(b)

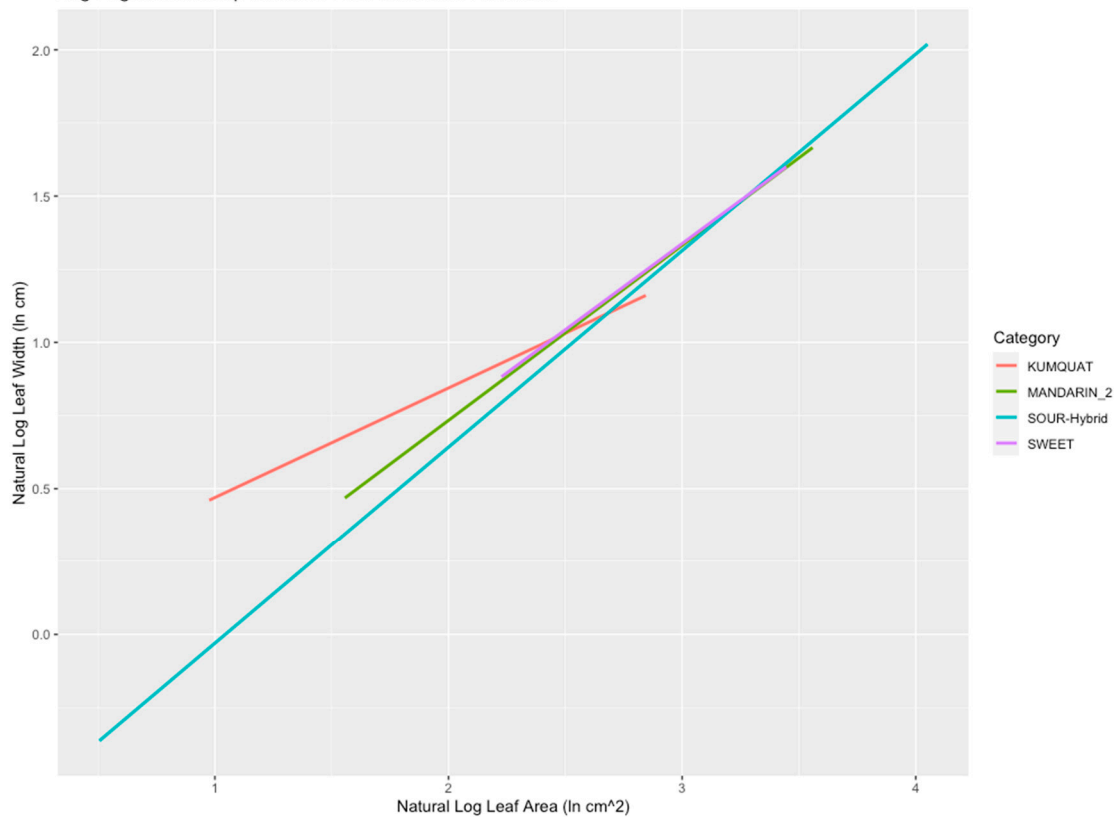
Supplementary Figure S1: (a) Natural log comparison of area vs length for citrus species. (b) Natural log comparison of area vs width for citrus species. Any change in slope between each category indicates a difference in dimensions.

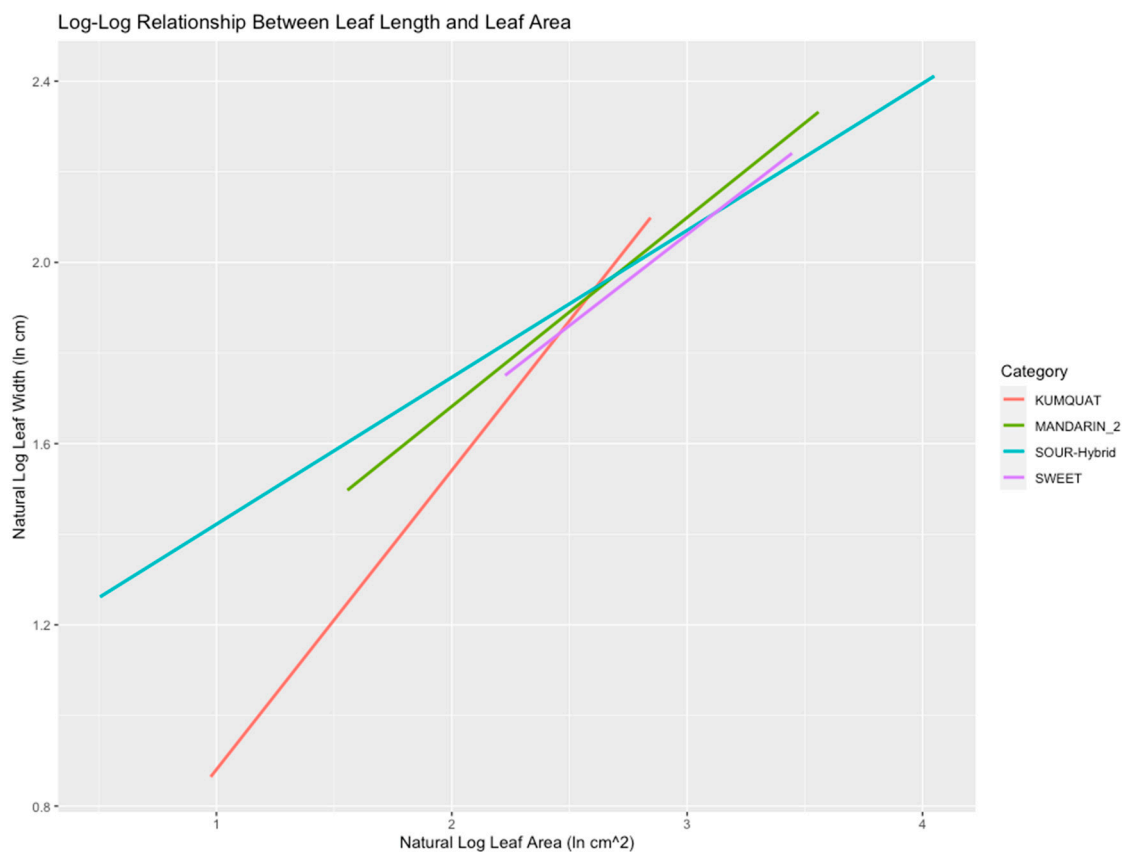


Log-Log Relationship Between Leaf Length and Leaf Area

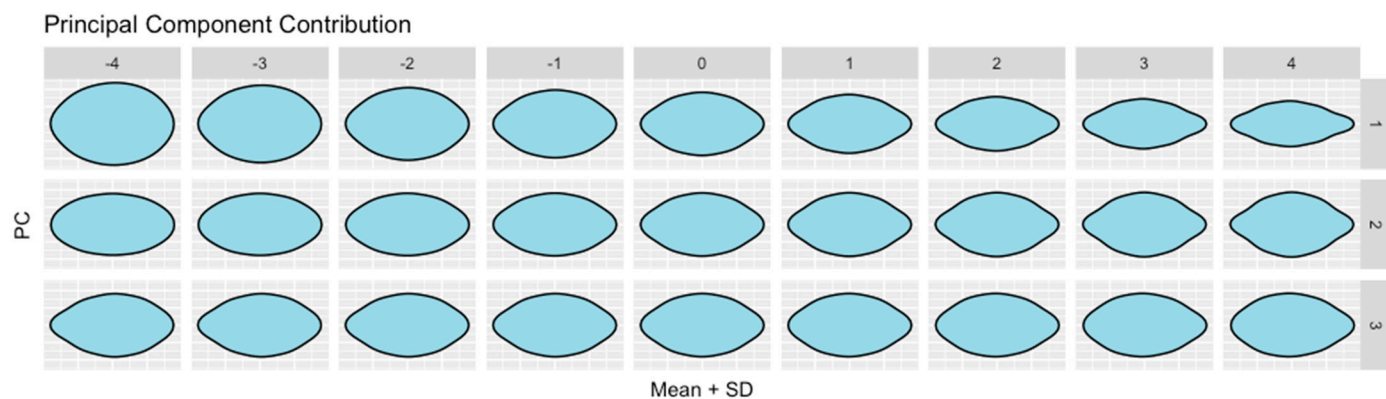


Log-Log Relationship Between Leaf Width and Leaf Area

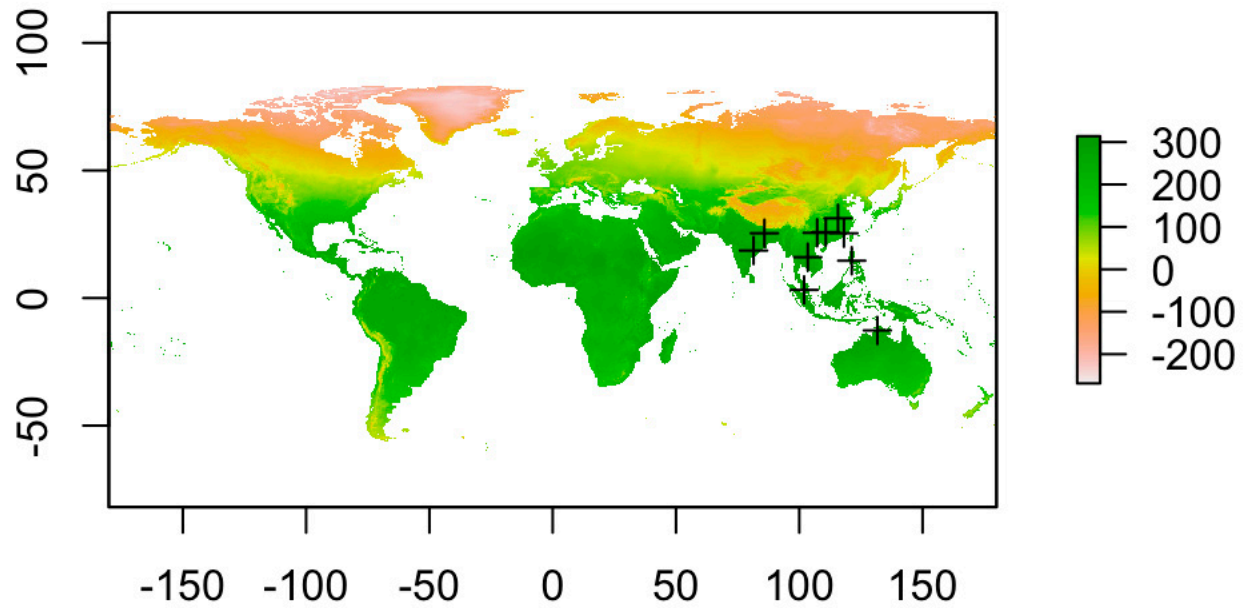




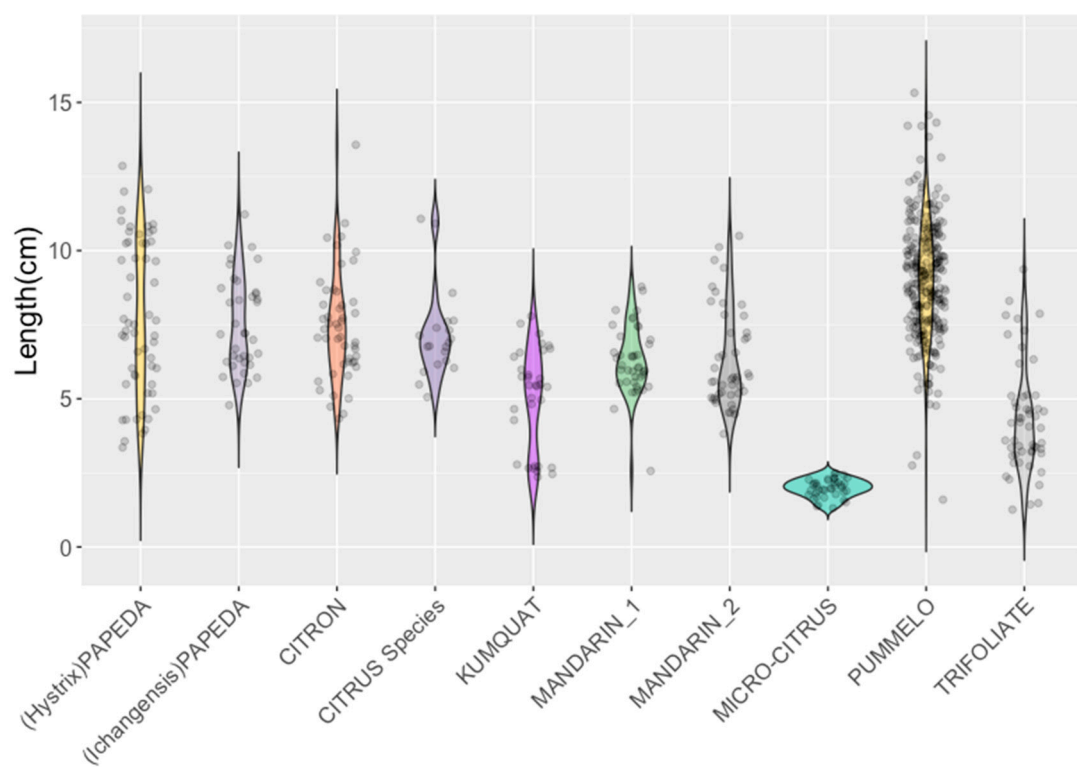
Supplementary Figure S2: (a,b,c,d) Natural log comparison of area vs length or width. Any change in slope between each category indicates a difference in dimensions.



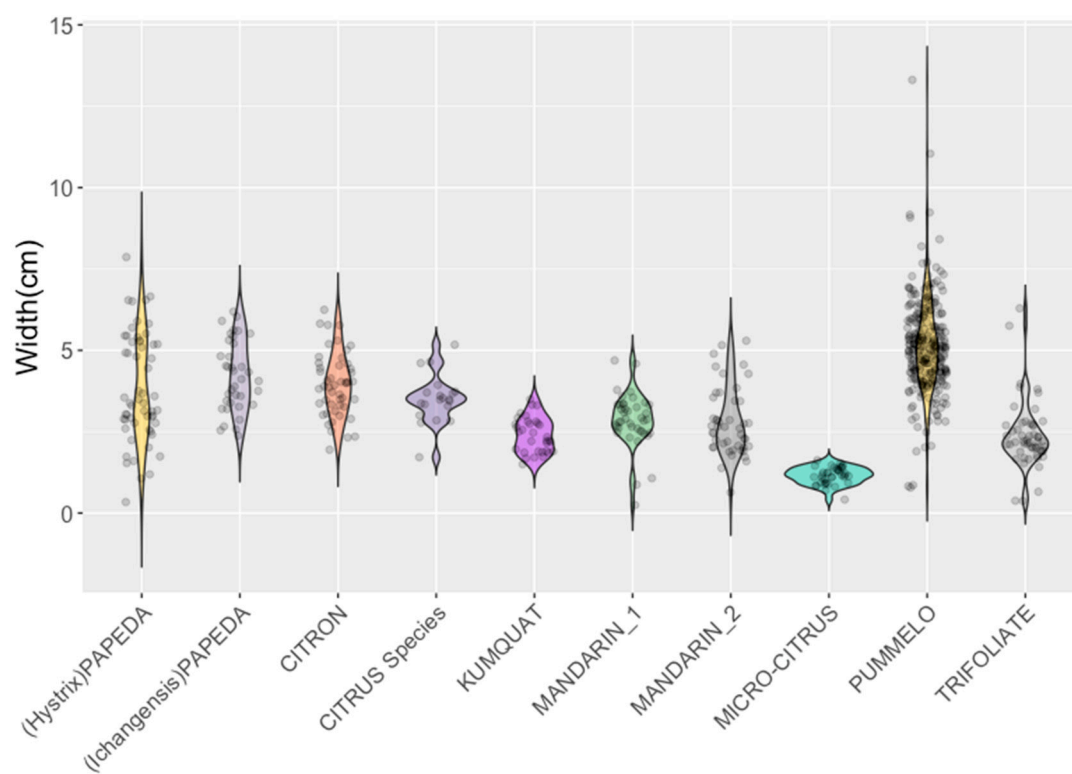
Supplementary Figure S3: Principal component contribution graph with the y axis denoting the PC number, the x axis being the mean shape and standard deviations of the mean shapes across the spectrum of eigen values generated by the elliptical fourier analysis and translated into components. This is the same data used to generate the values in Figure 3a in the main text.



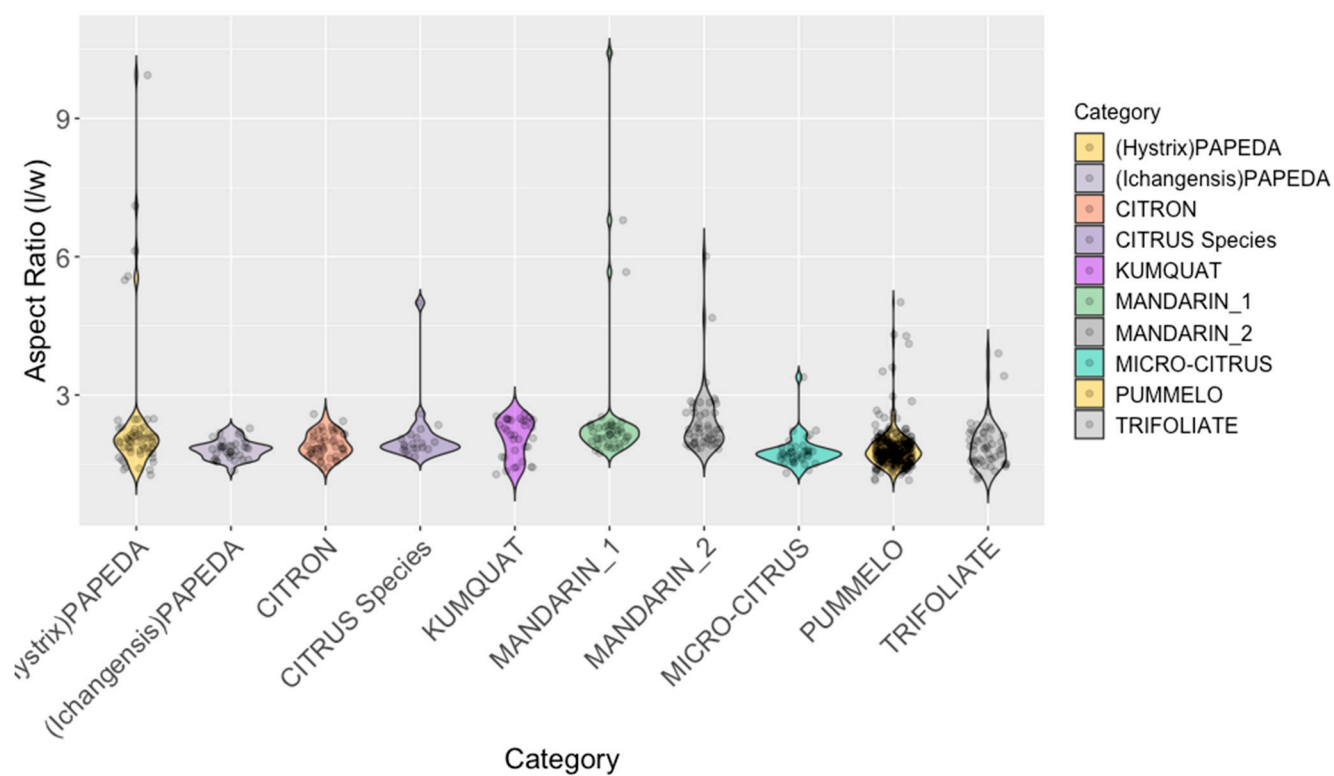
Supplementart Figure S4: World Clim map of coordinate points used for climate data. Coordinates listed as follows: *C.maxima* 16.015777, 103.448887, *C.medica* 18.616631, 81.47623 - 25.395202, 85.870762, *C.micrantha hongensis* 14.624152, 121.278345, *C.micrantha hystrix* 3.182375, 101.964380, *C. trifoliata* 25.840986, 110.765782, mandarin group north 31.267677, 115.70963, australasica -12.691577, 131.663257, 129.422046, Kumquat 25.388846, 118.098014



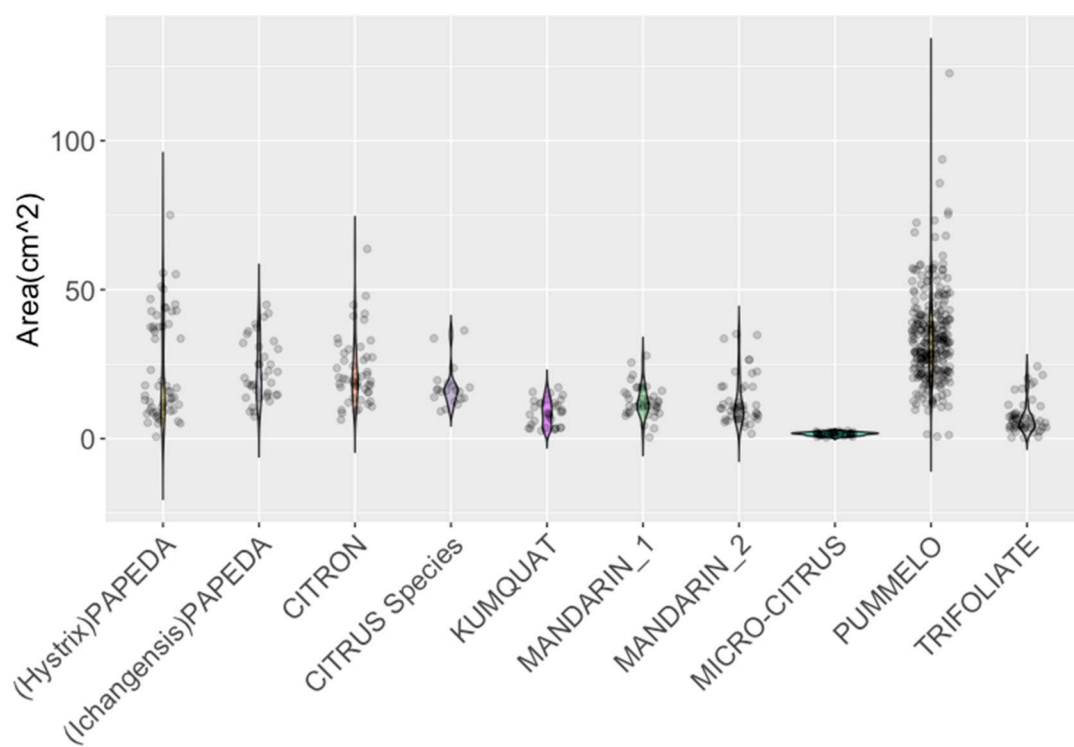
(a)



(b)

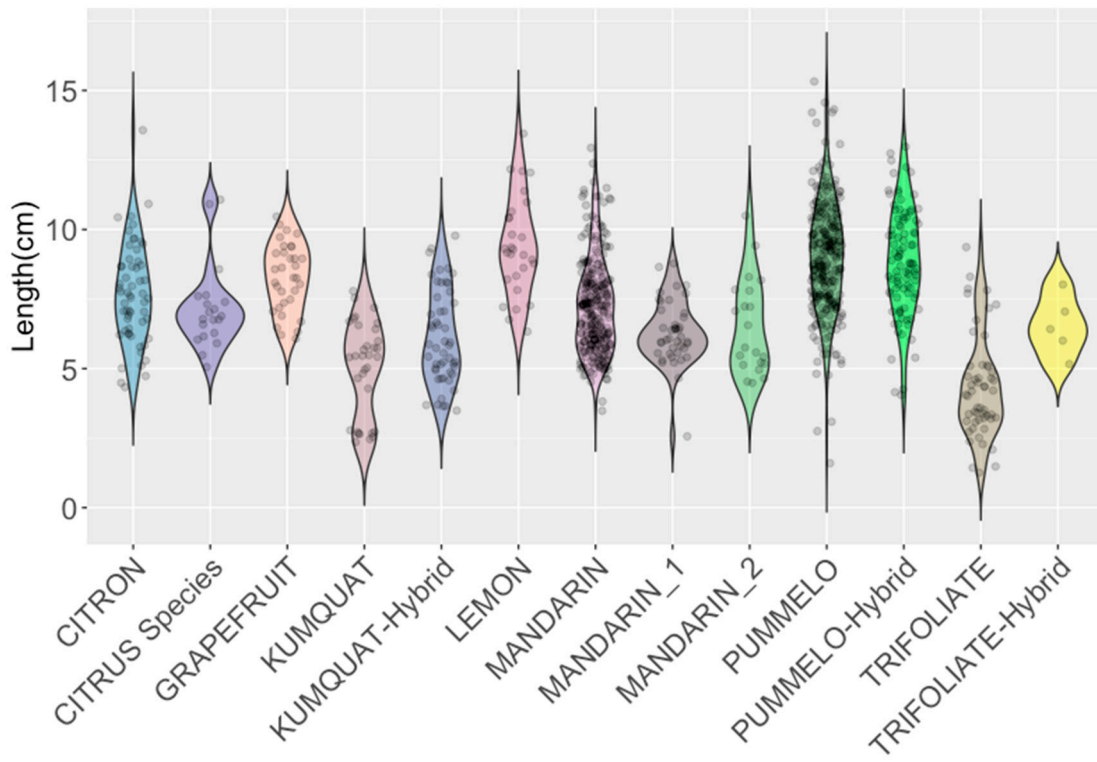


(c)

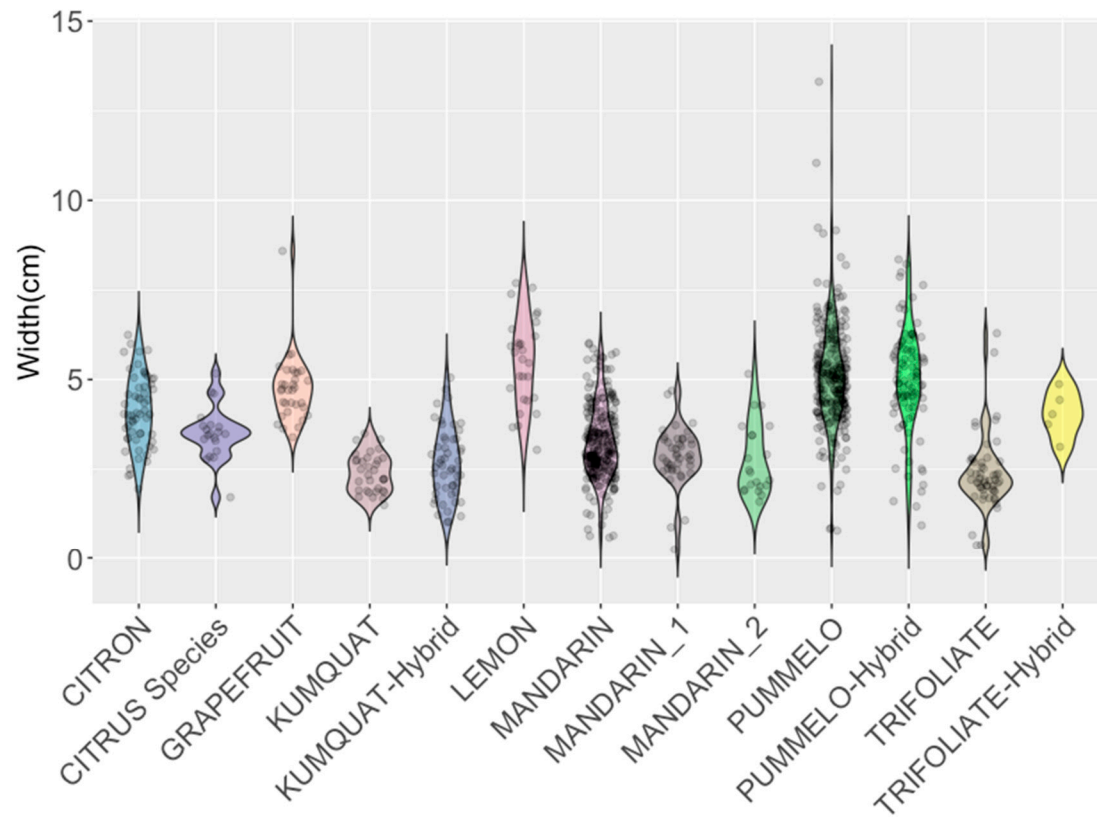


(d)

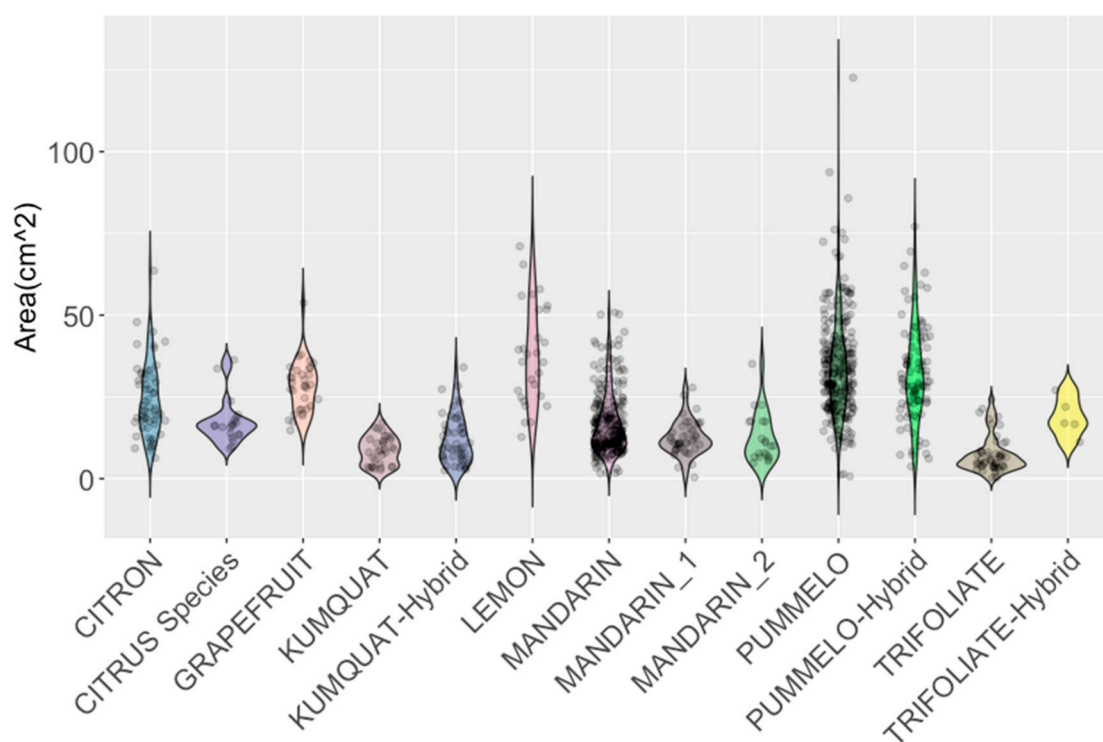
Supplementary Figure S5: (a,b,c,d) violin plots of the distribution of leaf length, width area and aspect ratio in different species of Citrus. Each dot represents a single leaf.



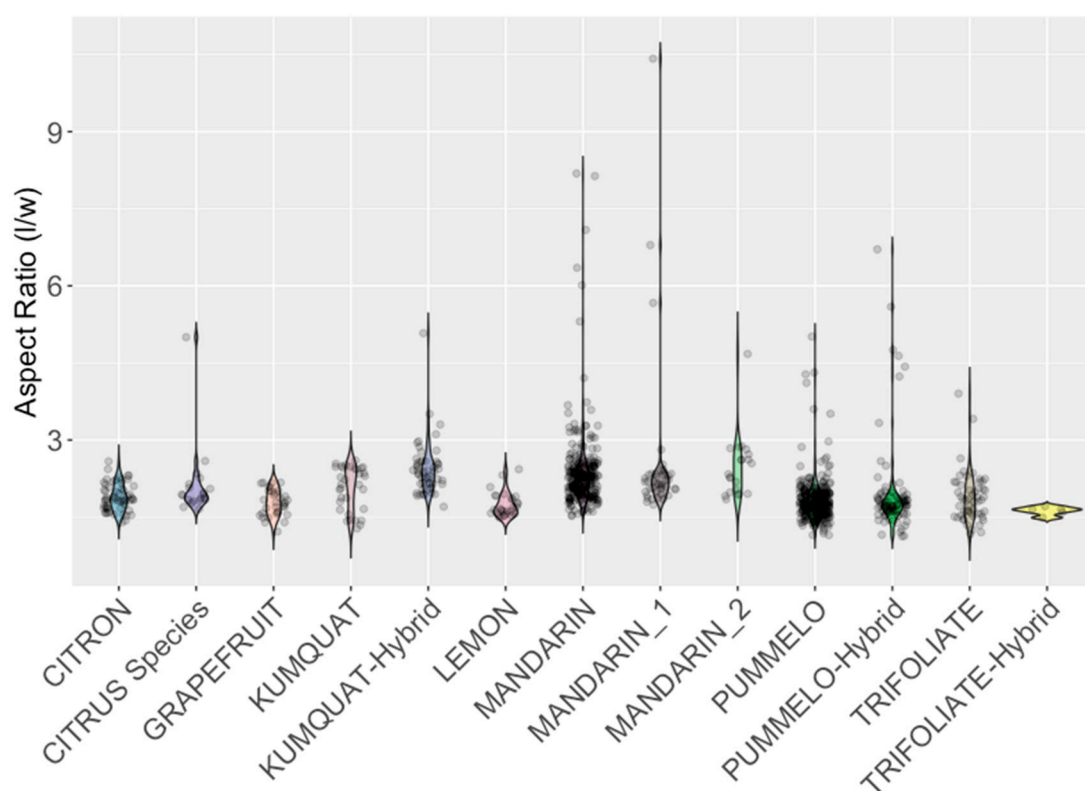
(a)



(b)



(c)



(d)

Supplementary Figure S6: (a,b,c,d) Violin plots depicting the distribution of length, width, area, and aspect ratio for both hybrid and original varieties. In this publication, a hybrid is defined as a variety resulting from the intentional crossing of two distinctly different citrus types. This includes hybrids resulting from past generations or intentional crosses to achieve specific phenotypes (e.g., crossing a grapefruit with a sweet orange to create a sweet orange and grapefruit hybrid).