A leaf morphometrics comparison between the deciduous plane tree *Platanus orientalis* L. and its ever-growing mutation *Platanus orientalis* L. var. *cretica*

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Background

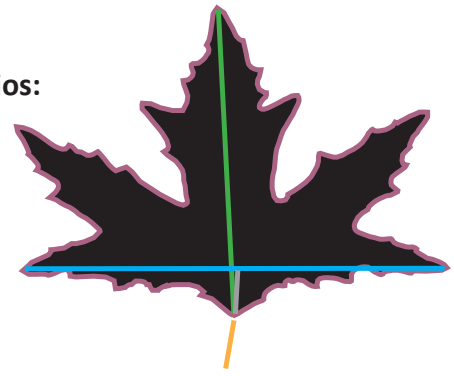
Platanus orientalis L. var. *cretica* is the ever-growing mutant of *Platanus orientalis* L. (plane tree).
The *Platanus orientalis* L. var. *cretica* population consists of few trees, growing isolated in the island of Crete, Aegean Archipelago, Greece, while the typical plane tree form is ubiquitous to the island, mainly present in streams and ravines [1], [2].
It is shown [3] that, although the typical form and the mutation share the same gene pool, they are genetically differentiated.

Materials & Methods

We studied 23 pairs of mutant and adjacent typical plane trees using the ImageJ software.
We measured six leaf morphometrics parameters in ten leaves per tree to derive five independent of size leaf shape ratios. We conducted paired comparisons using Kruskal-Wallis tests via the SPSS software.

Leaf Shape Ratios:

1) BW/LL
2) LL/LW
3) PL/LL
4) BW/LW
5) Perim/Area



(PL: Petiole Length; LL: Leaf Length; LW: Leaf Width; BW: Vertical Distance between Leaf Base and Leaf Width; Perim: Leaf Perimeter; Area: Leaf Area)

Results (1/2)

Statistically significant differences ($p<0.05$) in the majority of the analyzed ratios were detected in 35% of the studied pairs.

Results (2/2)

Table 1. Asymptotic significance for each mutant-control pair in the five leaf shape ratios. Numbers in green indicate asymptotic significance < 0.05; highlighted rows signify pairs that are significantly different in the majority of the studied ratios.

A/A Pair	BW/LL	LL/LW	PL/LL	BW/LW	Perim/Area
1	0.019	0.01	0.406	0.002	0.082
2	0.821	0.496	0.29	0.705	0.326
3	0.226	0.406	0.257	0.226	1
4	0.791	0.496	0.705	0.384	0.45
5	0.597	0.85	0.91	0.45	0.001
6	0.97	0.241	0.001	0.705	0.023
7	0.45	0.082	0.131	0.151	<.001
8	0.406	0.94	0.008	0.65	<.001
9	0.028	0.011	0.011	0.011	0.735
10	0.226	0.023	<.001	0.034	<.001
11	0.705	0.174	<.001	0.226	0.94
12	0.199	0.326	<.001	0.112	<.001
13	0.364	0.07	<.001	0.082	<.001
14	<.001	<.001	<.001	<.001	0.003
15	0.019	0.705	0.406	0.054	0.041
16	0.88	0.082	0.041	0.597	0.07
17	0.821	0.364	0.002	0.597	0.028
18	0.002	<.001	0.002	<.001	0.112
19	0.257	0.65	0.821	0.174	0.496
20	<.001	<.001	0.001	<.001	0.326
21	0.023	0.131	<.001	0.013	<.001
22	0.016	<.001	<.001	0.005	<.001
23	0.545	0.45	0.01	0.326	0.112

Table 2. Mean, Standard Deviation (SD) and Coefficient of Variation (CV%) of the five ratios for the *P. orientalis* (Control) and *P. orientalis* var. *cretica* (Mutant) total leaf sample.

		BW/LL	LL/LW	PL/LL	BW/LW	Perim/Area
Control						
	Mean	0.396	0.910	0.280	0.374	1.067
	SD	0.146	0.145	0.101	0.184	0.204
	CV %	36.95	15.94	36.07	49.10	19.10
Mutant						
	Mean	0.489	1.027	0.202	0.514	1.268
	SD	0.144	0.186	0.078	0.204	0.340
	CV %	29.55	18.06	38.60	39.69	26.82

Discussion

We found that in the majority of the pairs, leaf shape ratios do not differ significantly. Given that the ever-growing phenotype is genetically controlled, it appears that genes controlling the ever-growing phenotype in *P. orientalis* are not directly linked to leaf shape.

Conclusion

Leaf morphometrics present notable phenotypic variation which can be valuable in diversity studies. Nevertheless, they are not particularly useful in distinguishing *P. orientalis* and the ever-growing *P. orientalis* var. *cretica*.

Literature

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