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Photosynthetic Advantage of Invasive Species

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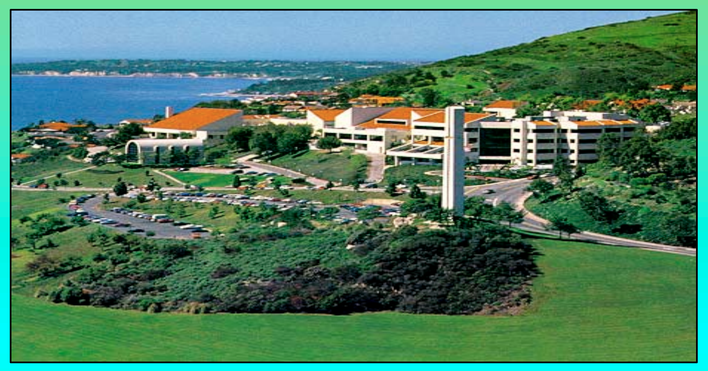


Abstract

Californians have greatly benefited from the introduction of plant and animal species necessary for food or other human pursuits; however, there are many other introduced species that can wreak havoc on the state's environment and economy. Invasive species threaten the diversity and abundance of native species by both competing for resources and causing changes to the natural habitat. We hypothesize that invasive species will have higher photosynthetic and conductance rates which contribute to their success. Through their impacts on natural ecosystems, agricultural lands, and water delivery systems, invasive species may also negatively affect human health and possibly even the economy.

Introduction

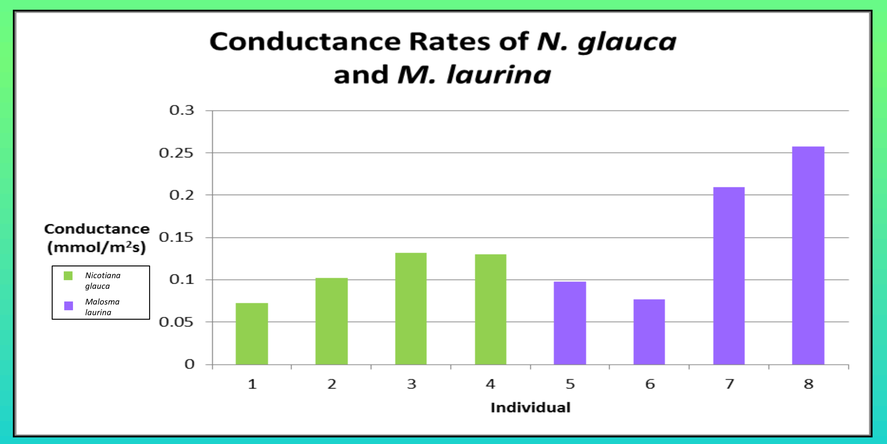
With the use of a LI-6400XT Portable Photosynthesis and Fluorescence System, a variety of both native and invasive plant species will be studied. From the data collected with the LI-6400XT, comparisons of both photosynthetic and conductive effectiveness will allow for an understanding of how invasive species have adapted to have such competitive advantages. While future plans include studying a variety of species, both native and invasive, the immediate focus will be in comparing the invasive *Nicotiana glauca*, Tree Tobacco, with *Malosma laurina*, also known as Laurel sumac. The natural habitat to be studied and observed will be the hillsides of Malibu, California.

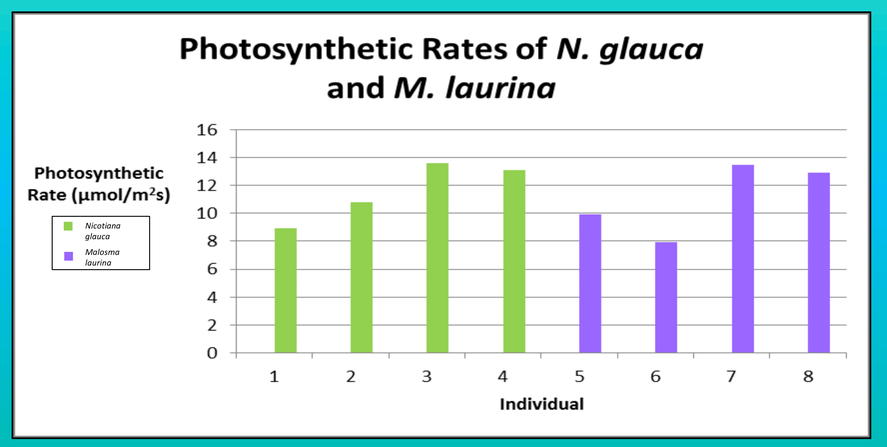
Methods

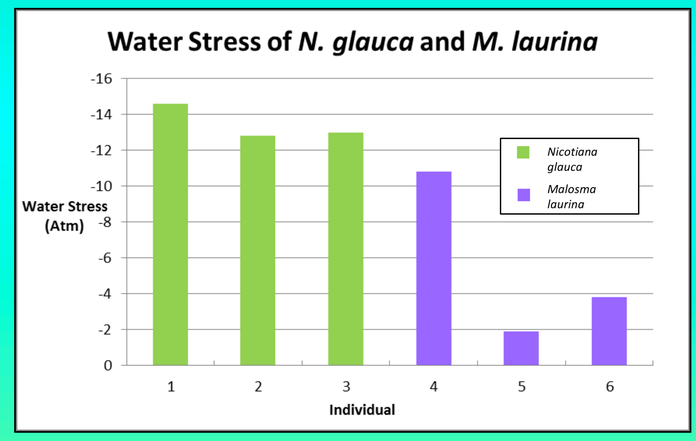
With the use of a LI-6400XT Portable Photosynthesis and Fluorescence System, a variety of data was collected from an invasive and a native species. From the data collected with the LI-6400XT, comparisons of both photosynthetic and conductive effectiveness were determined. Further data was collected using a Scholander Hammel Pressure Chamber which allowed for the determination of water potential and water stress.

Results

	Nicotiana glauca				*Malosma laurina*			
Individual	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Photo	8.9	10.8	13.6	13.1	9.95	7.95	13.5	12.9
Conductance	0.0724	0.102	0.132	0.13	0.0982	0.0767	0.21	0.258
Fv'/Fm'	0.482	0.496	0.507	0.457	0.453	0.425	0.509	0.51
Fs	628.3	589.5	521.4	485.4	346.7	341.5	493.8	572.8
Phi PS2	0.215	0.244	0.288	0.268	0.296	0.264	0.133	0.222
ETR	112.67	128.4	151.171	140.796	155.774	138.246	136.8147	116.424
qP	0.446	0.493	0.567	0.586	0.654	0.62	0.262	0.434
qN	1.93	1.983	2.028	1.842	1.829	1.47	2.037	2.041







Conclusion

- The results allowed us to look at various parameters of the physiology of each plant.
  - There was no significant difference between the photosynthetic rates of the invasive *N. glauca* and native *M. laurina.*
  - Significant water stress variation between the two species leads to the conclusion that research should be done during a more wet season to do a fair physiological comparison between *N. glauca and M. laurina.*
- Future research should be conducted to determine:
  - photosynthetic and conductance rates to compare to the current data.
  - if a wider variety of species would support this hypothesis.

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