

Lethal Salinity Concentration Varies Among *Vallisneria americana* Ecotypes

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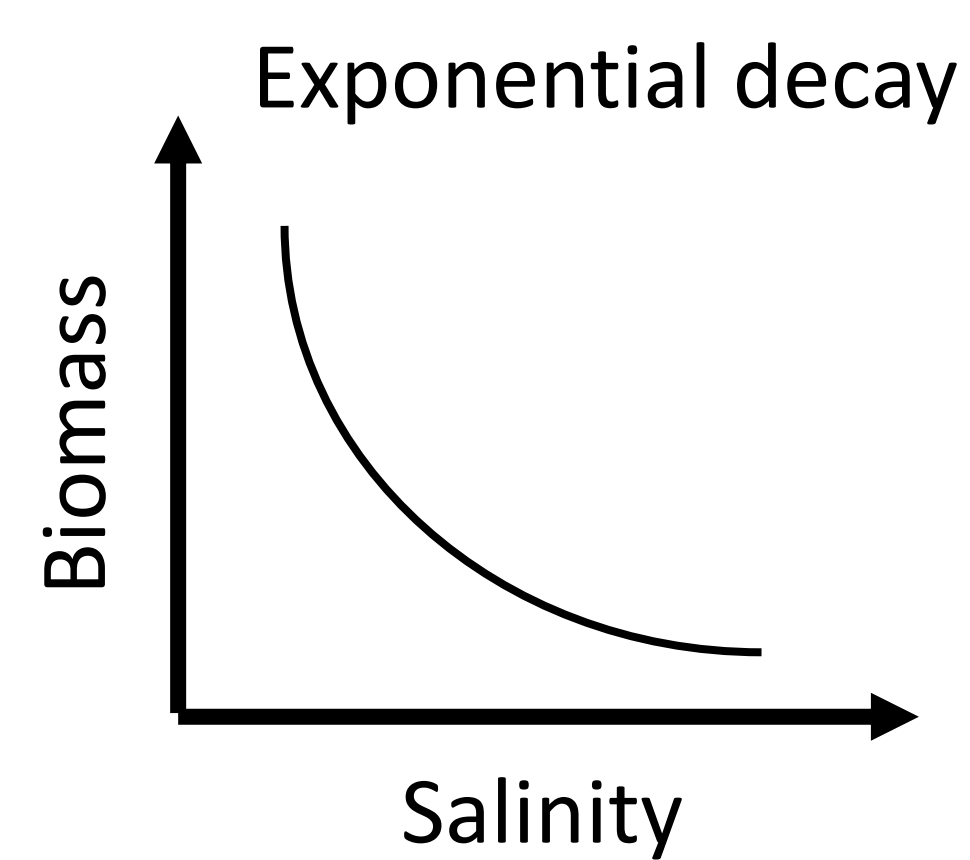
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Introduction

- Vallisneria americana* is a submersed aquatic plant that lives in fresh and brackish water, but high seasonal salinity could reach salt tolerance threshold for this plant and affect its growth and establishment.
- It is suggested that some ecotypes (locally adapted populations) may tolerate higher salinity concentration.

Methods

- In this study we tested long-term salt stress on twenty-six ecotypes of *V. americana*.
- Instant Ocean aquarium salt was used to create saline solutions [0.2, 2.0, 4.0, 10.0, 15.0 and 20.0 parts per thousand (ppt)]; plants were abruptly exposed to these saline solutions and maintained in these concentrations for 5 weeks before being visually assessed and harvested for dry weight.
- Analysis of variance and non-linear regression were used to calculate lethal concentration (LC₅₀) of salt that can reduce 50% of plant biomass.



Conclusion

- Salt tolerance varied among ecotypes.
- Most ecotypes stopped their growth at 10 ppt and perished at 15 ppt.
- Ecotypes with lower growth rates did not die at lower salinity concentration and hence growth rate is not the main determinant of salt tolerance.
- Most salt tolerant ecotype had positive growth at 15 ppt with LC₅₀ of 9 ppt.

Submersed aquatic plant

Vallisneria americana

tolerates 5 to 15 parts per thousand salinity concentration.

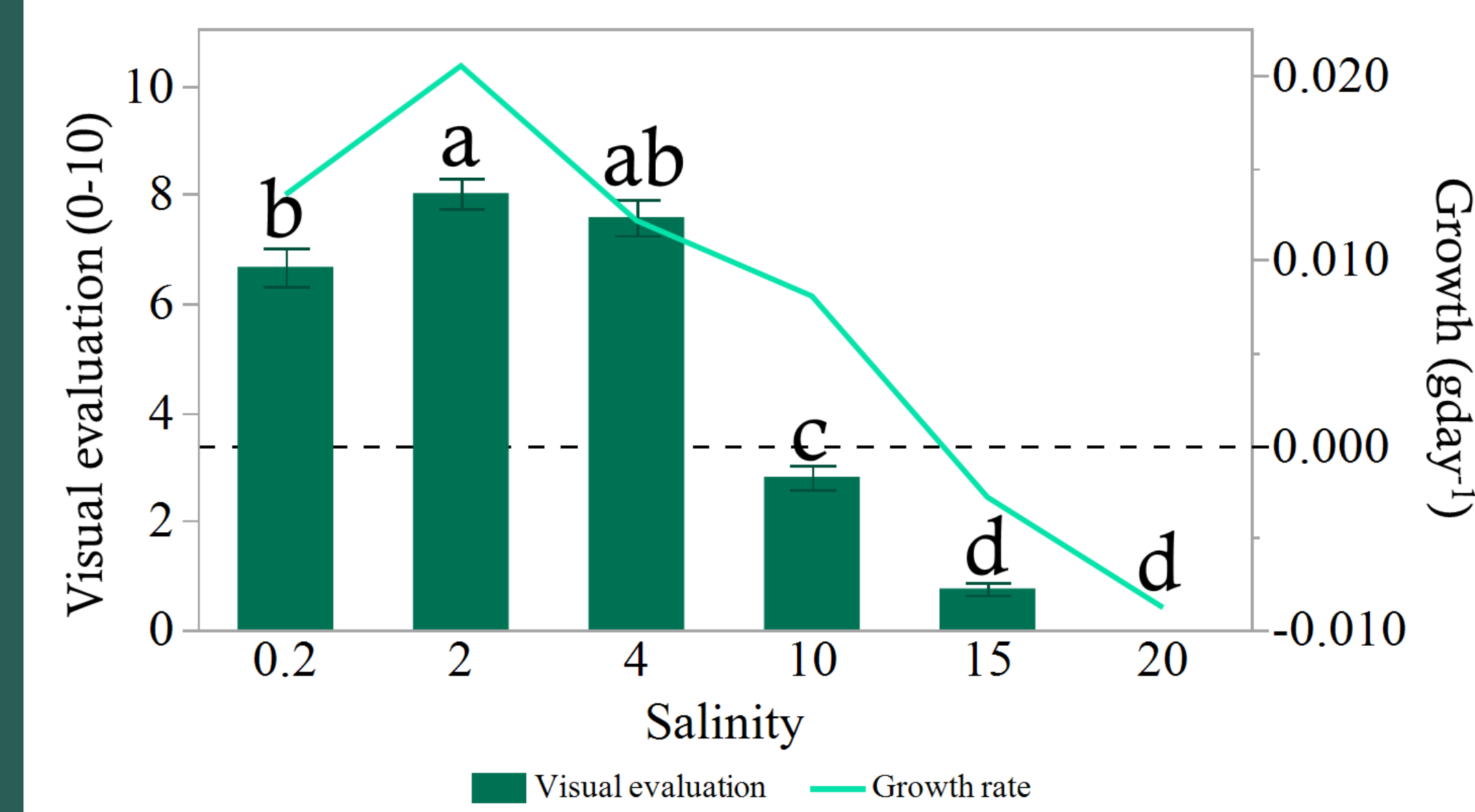
Salt tolerant **ecotypes** can be used for **revegetating** deteriorated **estuaries.**



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Mean visual evaluation and growth rates of *Vallisneria americana* across salinity gradient. Letter differences on top of the bars denote significant ($P < 0.05$) differences in visual quality.

Lethal concentration (LC₅₀), lower and upper 95% confidence intervals are calculated based on visual evaluation model.

Ecotype	LC ₅₀	Lower	Upper	R ²
Bird	9.0	6.6	14.2	0.76
Idaho	5.6	4.4	7.6	0.89
George	4.5	3.7	5.6	0.95
Indiana*	5.9	4.0	11.0	0.71
Mann	5.5	4.1	8.2	0.86
Toho	4.6	3.7	6.2	0.92
Monroe	5.1	3.6	8.8	0.78
Ballen	5.4	4.0	8.2	0.84
Okeech	4.8	3.4	8.2	0.80
Trafford	4.4	2.6	13.3	0.62
Kennedy	5.3	4.4	6.7	0.93
Wekiva	3.0	2.0	6.0	0.81
Wakulla	3.8	2.5	8.5	0.69
Rockstar	5.4	3.5	11.7	0.68
Pierce	3.8	2.8	5.6	0.89
Harris	1.1	0.9	1.6	0.93
STA	4.3	3.0	7.6	0.80
Suwanee*	3.8	2.1	15.7	0.59
Weekie	3.5	2.2	7.9	0.74
Harney	4.3	2.9	8.5	0.76
Rainbow*	3.7	1.7	>20	0.38
Feather	4.1	3.2	6.0	0.89
Biven	5.9	4.0	11.5	0.70
Snarrow*	4.3	1.6	6.6	0.23
Fairview	5.4	3.8	9.5	0.76
Caloosa*	1.2	0.6	13.9	0.49

* Ecotype did not show a significant response to salinity gradient based on standard least square analysis.