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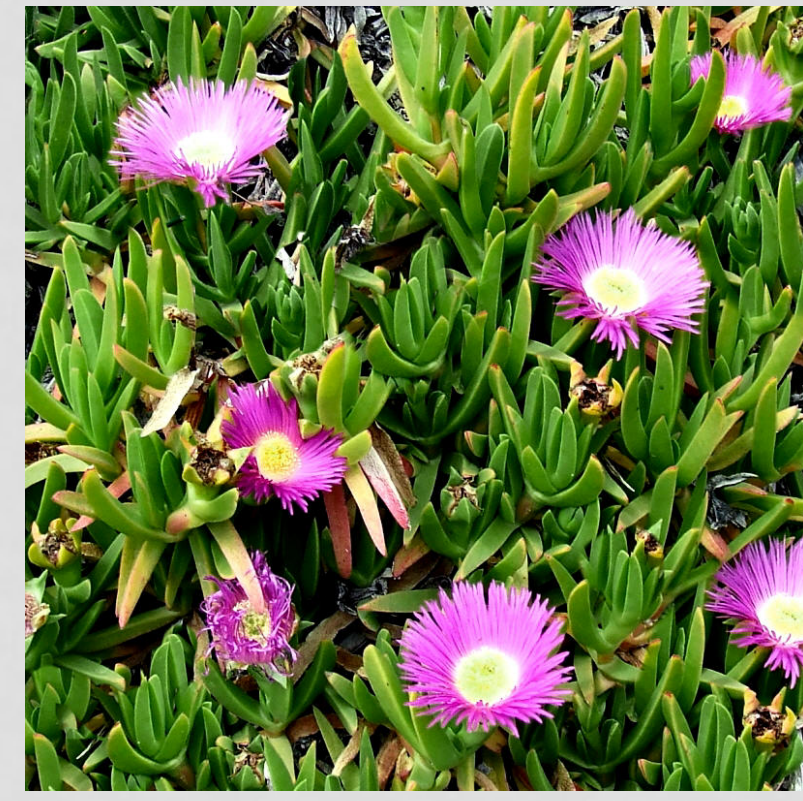
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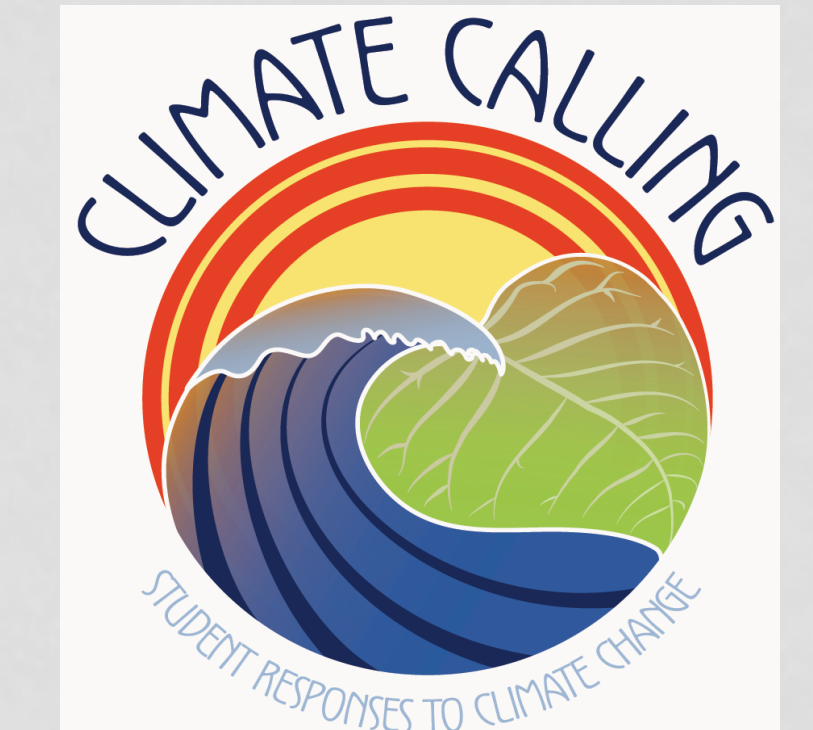
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Coreopsis gigantea and Ice Plant Relationship on Point Dume



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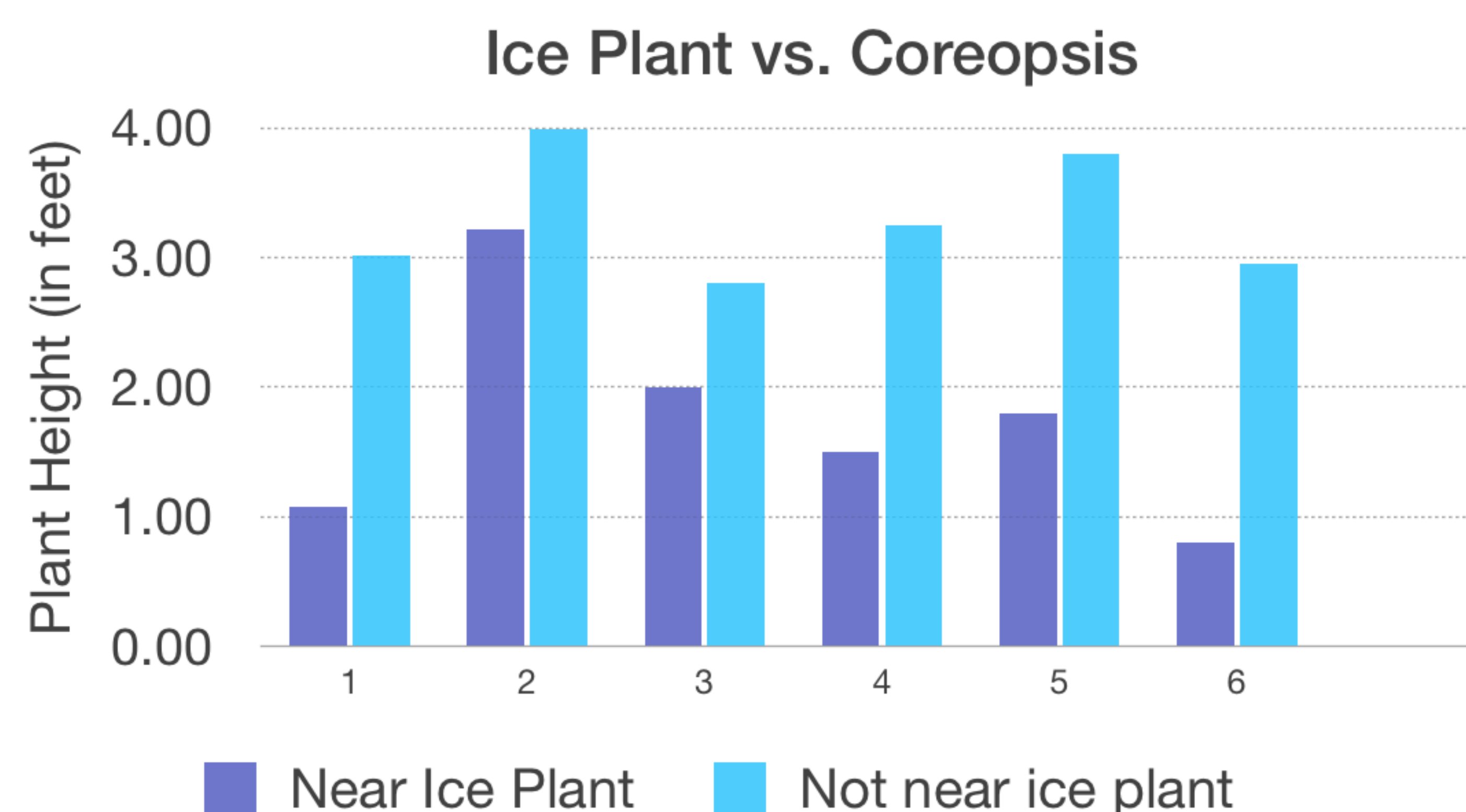


Abstract: This study looks to determine the affects of the non-native ice plant on the native *Coreopsis gigantea* located at Point Dume in Malibu, California. After examining the size of the *Coreopsis* we were able to identify that they were smaller in height when growing next to the ice plant and greater in height when farther away. We concluded that the *Coreopsis* does survive next to the ice plant, however its growth is restricted. Through our research we discovered many factors that could attribute to the growth difference, yet further research is necessary to decipher the main one.

Introduction: We hypothesize that *Coreopsis* will survive despite the disruptive nature of the non-native Ice Plant. Despite the invasive tendency of *Mesembryanthemum crystallinum*, the *Coreopsis* plants will still grow normally and thrive whether they are forced to cohabitate with this plant or live individually. Non-native plants, such as the ice plant, are typically viewed negatively and seen as harmful competition to the plants that previously grew and lived in these habitats. Despite the ice plants destructive nature, the *Coreopsis* has the ability to coexist because of its difference in dormancy. The ice plant and the *Coreopsis* both go dormant during different seasons. This allows for one plant to thrive while the other is dormant. During the current severe drought in California, scientists are concerned for the well being of the native plants because of the harmful tendencies of the non-native ice plant. According to Vivrette (see sources), the ice plant is extremely invasive. Her studies show that the ice plant increases the salinity of the soil, which can be toxic to pre-existing plants. The entire surface of the ice plant is covered in trichomes which are full of a water solution that includes sodium chloride, thus killing other plants. The sole reason that the ice plant can live where it does and thrive is because of the vegetation type which is favorable to plants such as these.

Methods: We drove to Point Dume to measure the growth of the *Coreopsis* plant. We took measurements of the height of the *Coreopsis* plant. We measured six *Coreopsis* plants that are growing adjacent to the ice plant, and six plants that are growing relatively farther away from the ice plant. We were mainly looking to see if the *Coreopsis* grows at a similar height when it is next to the ice plant as when it is growing farther away from the ice plant. We suspect that the height, of both the near and far *Coreopsis*, will be similar. Even though the ice plant is non-native, we were looking to prove that it is not negatively invasive toward the *Coreopsis*. Point Dume is located in Malibu, California on the cliffs looking over Westward Beach. This nature preserve consists of hiking trails and beautiful lookouts. The landscape is made up of purple and yellow flowers of the ice plant and *Coreopsis*.

Results:



Discussion: The results from our experiment indicate that the *Coreopsis* plants growing nearer to the ice plants were smaller in size than the plants of the same species that grew farther away from the ice plants. The largest plants we measured were those that grew a significant distance away from any trace of the ice plant. We were faced with a challenge in obtaining thorough results because of the lack of plants to measure. In this current season, the *Coreopsis* plants are dormant and therefore our choices of plants to measure were limited. We were able to locate enough plants to attain measurements that allowed us to see how these plants are affected by the ice plant, but we have a small limited range of data, which can account for any errors that may be present in our research.

When looking at our findings, one may assume that the growth of the *Coreopsis* is limited because it is forced to compete with the ice plant that is sharing its environment. However, the literature we read tells us that this is not the case. The lack in growth in the *Coreopsis* plant is due to the increased levels of salinity that are present in the soil of which the ice plant inhabits. Looking specifically at the ice plant, it is important to note that they have specialized trichome cells known as epidermal bladder cells (Agarie), which increase the amount of salt storage, thereby increasing the salinity of the surrounding soil. The vegetation type and environment is crucial to the ability of an alien species to thrive (Larson and Anderson). Because the ice plant is able to grow so abundantly at Point Dume, it will continually increase the salinity of the soil and decrease the height that the *Coreopsis* grows to.

Conclusion: Our findings show that on Point Dume, the Ice Plant does act as an invasive species in its relationship to the *Coreopsis*. Our measurements shows that these two plants do coexist but the ice plant does have negative impact on the growth of the *Coreopsis*. Our results show that the average height of the *Coreopsis* growing near an ice plant was 1.7 feet and the average of the ones farther away was 3.3 feet. This lack in height of the *Coreopsis* growing near an ice plant shows that the ice plant is negatively invasive. However further research is needed to find specific reasons why this is the case.

Works Cited:

- Agarie, Sakae. (2007) "Salt tolerance, salt accumulation, and ionic homeostasis in an epidermal bladder-cell-less mutant of the common ice plant *mesembryanthemum crystallinum*", Oxford Journals.
- Emery, Sarah M. (2007). "Dominant species identity, not community evenness, regulates invasion in experimental grassland plant communities", Ecological Society of America.
- Larson, Diane L., (2001). "Alien plant invasion in mixed-grass prairie: effects of vegetation type and anthropogenic disturbance", Ecological Society of America.
- Muller, Cornelius H and Vivrette, Nancy J, (Summer 1977), "Mechanism of invasion and dominance of coastal grassland by *mesembryanthemum crystallinum*", Ecological Monographs, Vol. 47, No. 3, pp. 301-318
- Vivrette, Nancy. (1990). "Coastal bluff vegetation change over 25 years on santa cruz island", In Fifth Channel Island Symposium: schedule of symposium proceedings and events and presentation and poster abstracts.

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