Towards Understanding the Ecohydrologic Controls on the Phenology of Pima Pineapple Cactus

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1. Introduction

Under pressures of global change, land and wildlife managers are looking to find new ways to manage and preserve threatened and endangered species in their areas. A first step of managing local threatened and endangered species, is to understand the ecohydrological cues as indicators of ecological controls affecting the growth and distribution of the species. One example of this is the Pima Pineapple Cactus (Coryphantha robustispina var. scheeri), located in a small range within Texas, New Mexico, Southern Arizona, and a small region in Northern Chihuahua and Sonora Mexico. Because of the species’ very sparse distribution, little is known about the factors that contribute to Pima Pineapple Cactus distribution or growth.

Previous research indicates that Pima Pineapple Cactus is not pollinator limited, but little is known about the other conditions triggering flowering.

2. Problem Statement and Objective

- Intensifying land use and changing climate are affecting plant distributions and their phenology — the timing of important biological events such as flowering.
- Flowering conditions are especially critical for endangered species to preclude their ongoing demise.
- Often little is known about because their endangered status limits observations (in space and in time) of flowering and associated environmental conditions.

Our objective was to identify ecohydrological parameters that elicit flowering responses in the endangered Pima Pineapple Cactus.

3. Methods

- Air Force Plant 44 (AFP44) located in Tucson, Arizona, houses a rare relatively large, dense population of Pima Pineapple Cactus that has not been well characterized.
- Three phenological cameras (Moultrie I60) were installed in July 2013 to capture hourly photos of Pima Pineapple Cactus at three randomly selected sites within AFP44.

4. Results

Flowering Events

<table>
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<tr>
<th>Date (Month/Day)</th>
<th>Site 1</th>
<th>Site 2</th>
<th>Site 3</th>
</tr>
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<tbody>
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</tr>
<tr>
<td>09/11</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Flowering does not appear to be associated with air temperature.

5. Take Home Message

Based on these observations — to our knowledge the first photo-captured time series for the endangered Pima Pineapple Cactus — we hypothesize that flowering events for this species are triggered by a limited range of soil moisture conditions following a large monsoon rain event.

6. Acknowledgments

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