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Palmetto

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Tricks of the trade: characteristics of Florida Alicia that facilitate its persistence in Florida habitats.

Figure 1: Flowers of Florida Alicia at the top of a flowering stem. The thin yellow structures extending out of the central curled petals are the stigmas.

Figure 2: Section of a flowering stem of Florida Alicia with glandular trichomes and a trapped fly.

Walk through any scrub or sandhill in peninsular Florida between May and September and you'll notice golden flowers atop tall swaying stems (Figure 1). This is Florida Alicia (*Chapmannia floridana*), a herbaceous Florida endemic that is found in only 20 counties (*Atlas of Florida Plants*). In addition to inhabiting fire-maintained scrub and sandhill habitats (Gunn et al. 1980), Florida Alicia also occurs, often at high densities, in degraded scrub habitats, roadsides, and pastures. In fact, Florida Alicia is one of the few native scrub plants that persists in cattle-grazed pastures. Taking a closer look at Florida Alicia reveals several characteristics that allow it to persist in the habitats where it occurs.

During late May and early June 2015, I tagged and measured over 1,350 Florida Alicia individuals. Fewer than 10% of these were flowering, but they had multiple flowers on stems that averaged 1 meter in height. This is approximately 15 times taller than the average height of the non-reproductive stems I measured – taller than many neighboring shrub stems. Tall flowering stems likely promote flower visitation and pollination in Florida Alicia due to the high visibility of flowers to insect pollinators.

The flowering stems of Florida Alicia are covered with sticky hairs, called glandular trichomes, that trap small flies and possibly other insects (Figure 2). Trapped insects are a food source for predatory arthropods, and the presence of predatory arthropods on a plant decreases herbivory and increases fruit production (Krimmel and Pearse 2013). The Lynx Spider I observed sitting on a flowering Florida Alicia stem may have been attracted by trapped insects and subsequently deterred herbivory of flowers and seeds.

Florida Alicia is in the legume family (Fabaceae), and its fruits are segmented pods with several seeds.

Figure 3: Fruits of Florida Alicia covered with glandular trichomes. The fruit on the bottom left has broken latitudinally.

Figure 4: Florida Alicia individual with live stems (top right), dead stems (top left), and the upper part of the root system with swollen root sections.

Fruits of legumes typically split longitudinally, but the fruits of Florida Alicia split latitudinally (Figure 3), with one seed in each segment. Like the flowering stems, the fruits are covered with glandular trichomes. These trichomes may both protect against seed predation and aid in seed dispersal. The fruits stuck to my fingers, so it is easy to imagine them getting stuck in the fur of a passing deer and dispersed away from the parent plant. Because the fruits break into segments, individual seeds can be dispersed into a wider range of microsites, increasing their chance of ending up in a microsite suitable for germination.

To investigate the root system of Florida Alicia, I dug up 12 plants. Many plants in the legume family have mutualistic associations with nitrogen-fixing bacteria living in root nodules. Both organisms involved in a mutualistic association benefit. In the specific mutualism found in legumes, the plants get nitrogen (a commonly limiting soil nutrient) from the bacteria, while the bacteria get carbon (fixed in the process of photosynthesis) from the plant. However, I was unable to find any root nodules on Florida Alicia, suggesting that it does not form associations with nitrogen-fixing bacteria. Instead, this species may access nitrogen via its deep taproots. Florida scrub water tables are often found at depths of only 1-2 meters, and scrub plants access nitrogen from the water table, where nitrogen availability is relatively high (McKinley et al. 2009).

Because the roots of Florida Alicia are long, narrow, and grow deep into the sandy scrub and sandhill soils, I was rarely, if ever, able to dig up the entire root system. For a 1-centimeter tall plant in a pasture I had dug to a depth of 78 centimeters when I broke the root, leaving some in the

soil. Measurement of aboveground and belowground biomass of this plant indicated that at least 98.5% of the biomass of the plant was belowground. All of the other plants I incompletely dug up had over 70% of their biomass belowground. High belowground to aboveground biomass ratios are also found in Palmettos (Saha et al. 2010) and the scrub herb *Euphorbia rosescens* (Smith and Menges 2016); *E. rosescens* and Florida Alicia have similar root systems, with intermittent swollen sections along taproots (Figure 4). Allocation of a large proportion of biomass to belowground structures is common in plants that resprout after disturbances because belowground reserves are reallocated to those aboveground to create new stems and leaves. To assess the resprouting ability of Florida Alicia, I removed the aboveground biomass of 153 individuals in June 2015. Less than two months later, all but three had resprouted. Both fire and cattle remove entire stems of Florida Alicia individuals, and the ability to resprout is important for post-disturbance survival.

Tall flowering stems, glandular trichomes, deep roots, and high allocation of resources belowground likely all contribute to the persistence of Florida Alicia populations in pyrogenic scrub and sandhill and anthropogenically disturbed habitats. So next time you spot the golden flowers of Florida Alicia, take a minute to look for insects stuck to the stem and think about all that is under your feet.

References

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Call for Research Track Papers and Poster Presentations

Florida Native Plant Society 2018 Conference

The Florida Native Plant Society Annual Conference will be held at the Miccosukee Resort (500 S.W. 177th Avenue, Miami, FL 33194), May 17-20, 2018. The Research Track of the Conference will include presented papers and a poster session on Friday, May 18 and Saturday, May 19.

Researchers are invited to submit abstracts on research related to native plants and plant communities of Florida including preservation, conservation, and restoration. Presentations are planned to be 20 minutes in total length (15 min. presentation, 5 min. questions).

Abstracts of not more than 200 words should be submitted as a MS Word file by email to Paul A. Schmalzer at paul.a.schmalzer@nasa.gov by February 1, 2018. Include title, affiliation, and address. Indicate whether you will be presenting a paper or poster.

The Dan Austin Award for Ethnobotany

Through the leadership and generosity of our members, the Florida Native Plant Society will begin offering a grant award in memory and recognition of Dr. Dan Austin and his work in ethnobotany. The first grant award recipient will be announced at the 2018 Annual Conference in Miami. The Dan Austin Award for Ethnobotany will provide up to $1,500 to graduate or undergraduate students who are studying Florida ethnobotany (the study of the relationship between peoples or cultures with plants native to Florida or Florida ecosystems). These can be current uses or historic uses.

For more information about this award and to download an application, please visit the FNPS website fnps.org and click on "Grants and Awards".

Please join us in thanking the following generous sponsors for making this award possible:

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