Characteristics of plant communities invaded by *Dittrichia graveolens* (Asteraceae), as it spreads away from roadsides in Santa Clara County

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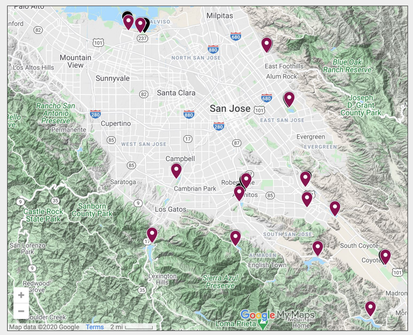
Introduction

Biological invasion occurs when an exotic species thrives and spreads in a new region[1]. Invasions often impose consequences on native species, communities, and ecosystems, and it is expected that the severity of these impacts will increase as more exotic species become established.

Dittrichia graveolens (stinkwort) is an annual plant in the Asteraceae family native to the Mediterranean Basin. It was first introduced to California in 1984 in Santa Clara County, where it grows along roadsides and in disturbed areas[2]. More recently, *Dittrichia* has been observed invading natural sites away from roads[3], representing a common pattern for invasive plants. To best direct resources for management and prevention, it is important that we understand which communities are most vulnerable to invasion.

Methods

- Plant community surveys were conducted at 15 locations in Santa Clara County
- Each location has 2 paired sites
  - Roadside and off-road
  - 30 sites total
- Roadside site is presumed source for off-road population
- Population size was estimated using categories (10; 50; 100; 500; 1,000; 10,000)



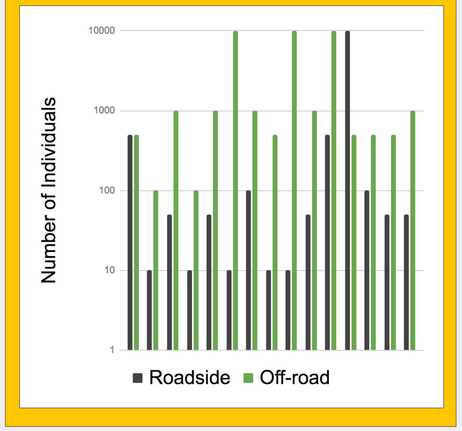
Roadside Population

Offroad Population

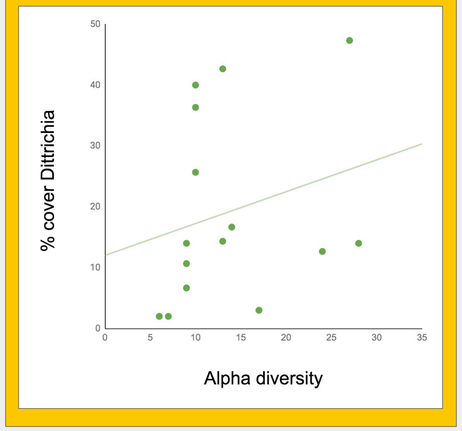
- Transect laid along longest axis of population
- Percent cover estimated using three 0.5m x 0.5m quadrats placed uniformly along transect
  - % cover *Dittrichia graveolens*
  - % cover bare ground
  - % cover other vegetation

Quadrat example:
Dittrichia graveolens
Other vegetation

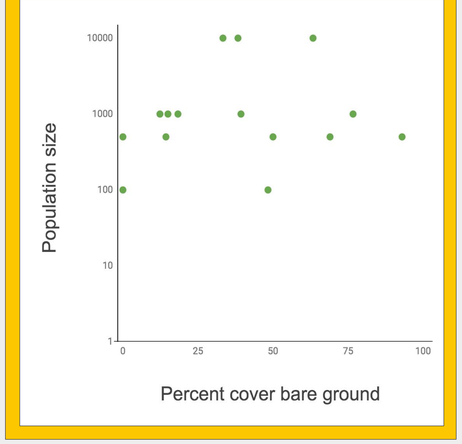
Off-road sites are larger in population size (number of individuals)



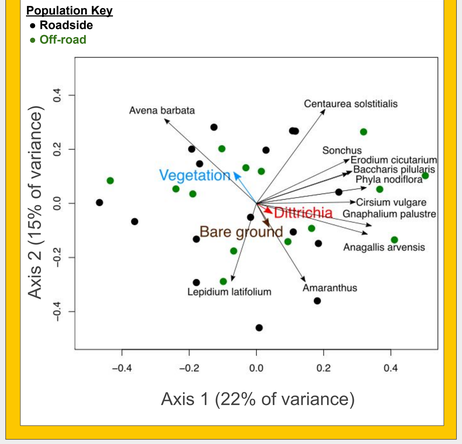
Dittrichia cover was higher, not lower, at more diverse off-road sites



Dittrichia population size was not strongly predicted by disturbance (bare ground)



Dittrichia associates more with other Asteraceae species and less frequently with *Avena*



Dittrichia tends to grow away from areas that are more densely vegetated with weedy species, including *Avena barbata*

Discussion

Our research shows that *Dittrichia graveolens* is invading away from roadsides. Off-road populations were often larger than roadside populations, demonstrating that *Dittrichia* can successfully take hold in vegetated communities. Even though there may be more species diversity in off-road populations, these communities are not immune to *Dittrichia* invading.

Large populations of *Dittrichia* were found across a broad range of disturbance levels (bare ground). In addition, the most invaded communities were comprised of Asteraceae species and other forbs. Exotic grasses such as *Avena barbata* may create a biological boundary that limits the ability of *Dittrichia* to invade.

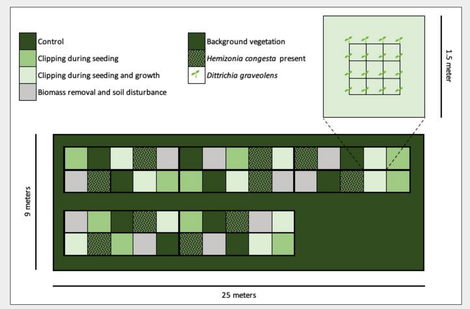
Take Home Messages for Management

1. **Potential for invasion away from roads.**
2. **We need to pay attention to controlling off-road populations.**
3. **More diverse sites, and less disturbed sites, are not necessarily protected from *Dittrichia* invasion.**
4. **Grassland sites strongly dominated by European annuals seem to be less invasible.**

Next Steps

Data presented are correlational. Next we will conduct an experiment where disturbance and biodiversity are manipulated.

Research is starting this fall at Blue Oak Ranch Reserve in Santa Clara County. The experiment will have 5 treatments: grassland control, 3 levels of disturbance (simulated mowing), and an addition of *Hemizonia congesta* subsp. *Luzulifolia*. *Dittrichia* seeds from roadside and off-road populations will be included.



We hope to present findings of this grassland competition and disturbance study next year!

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References

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