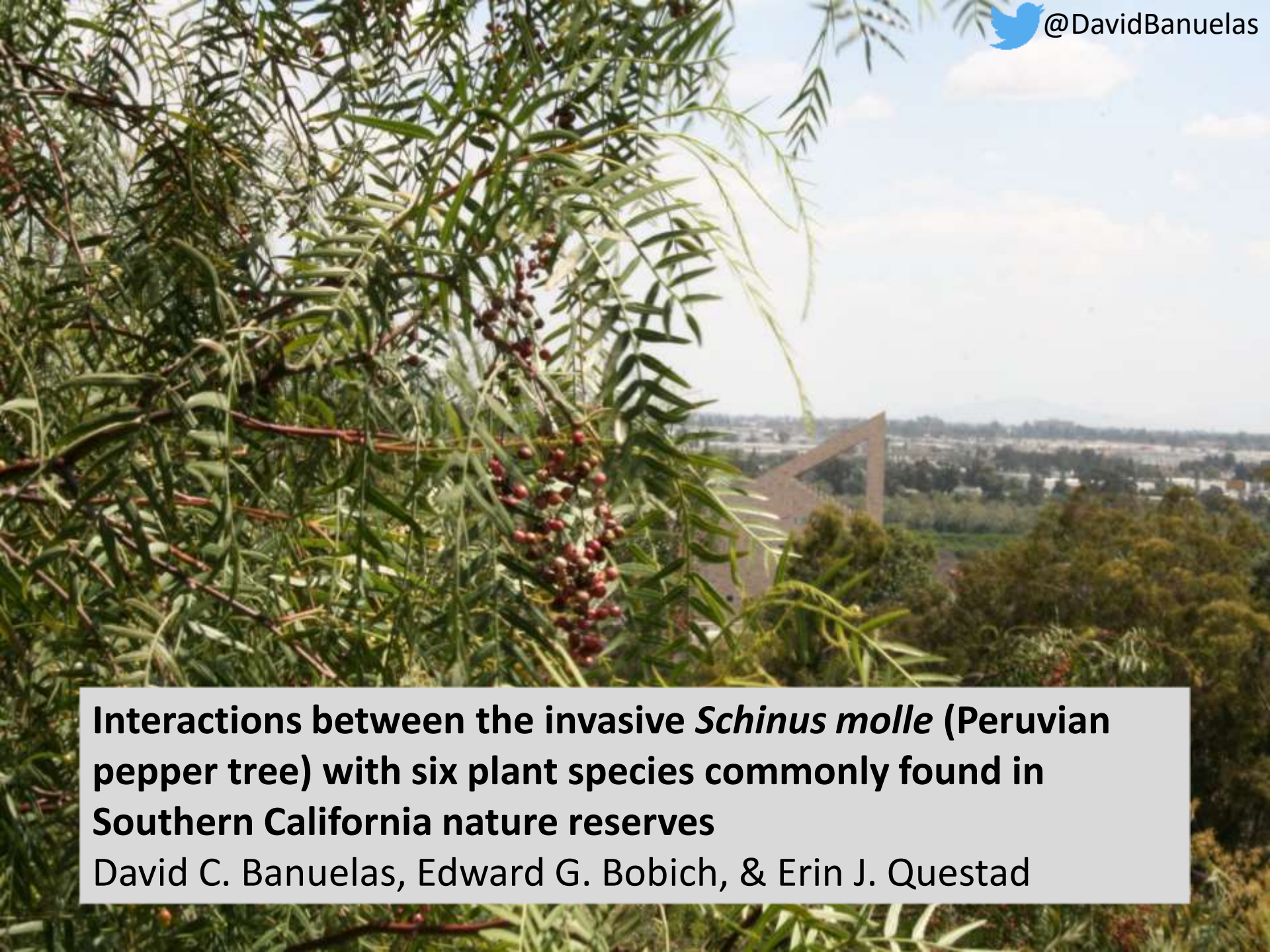

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Interactions between the invasive *Schinus molle* (Peruvian pepper tree) with six plant species commonly found in Southern California nature reserves

David C. Banuelas, Edward G. Bobich, & Erin J. Questad

Overview

1. **Introduce the Brazilian pepper tree's negative impact**
   - Allelopathy
   - Soil legacy effect
2. **Why the Peruvian pepper tree may have similar impacts**
3. **Experimental design and research questions**
4. **Potential uses of the Peruvian pepper tree in restoration**

Research Status:

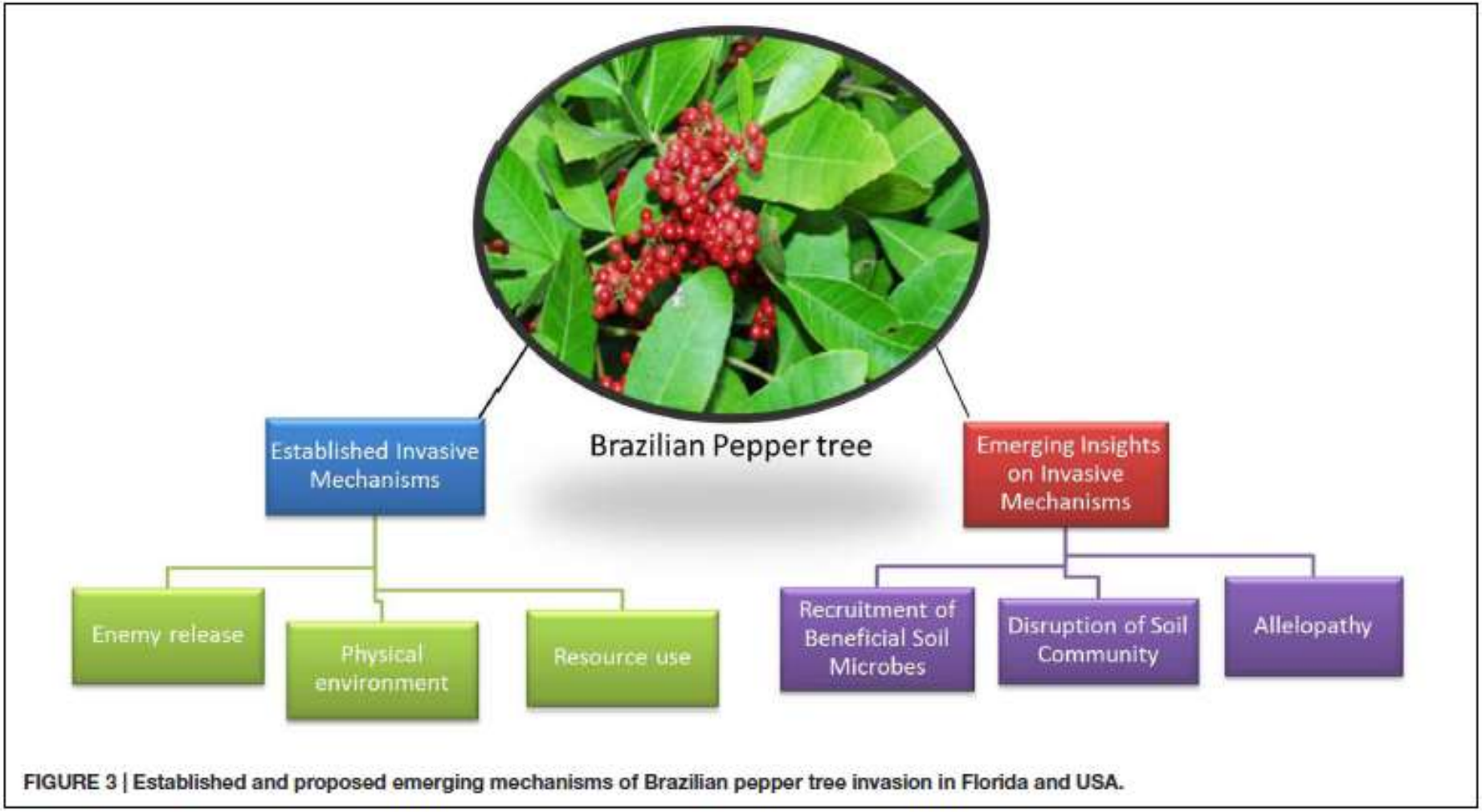


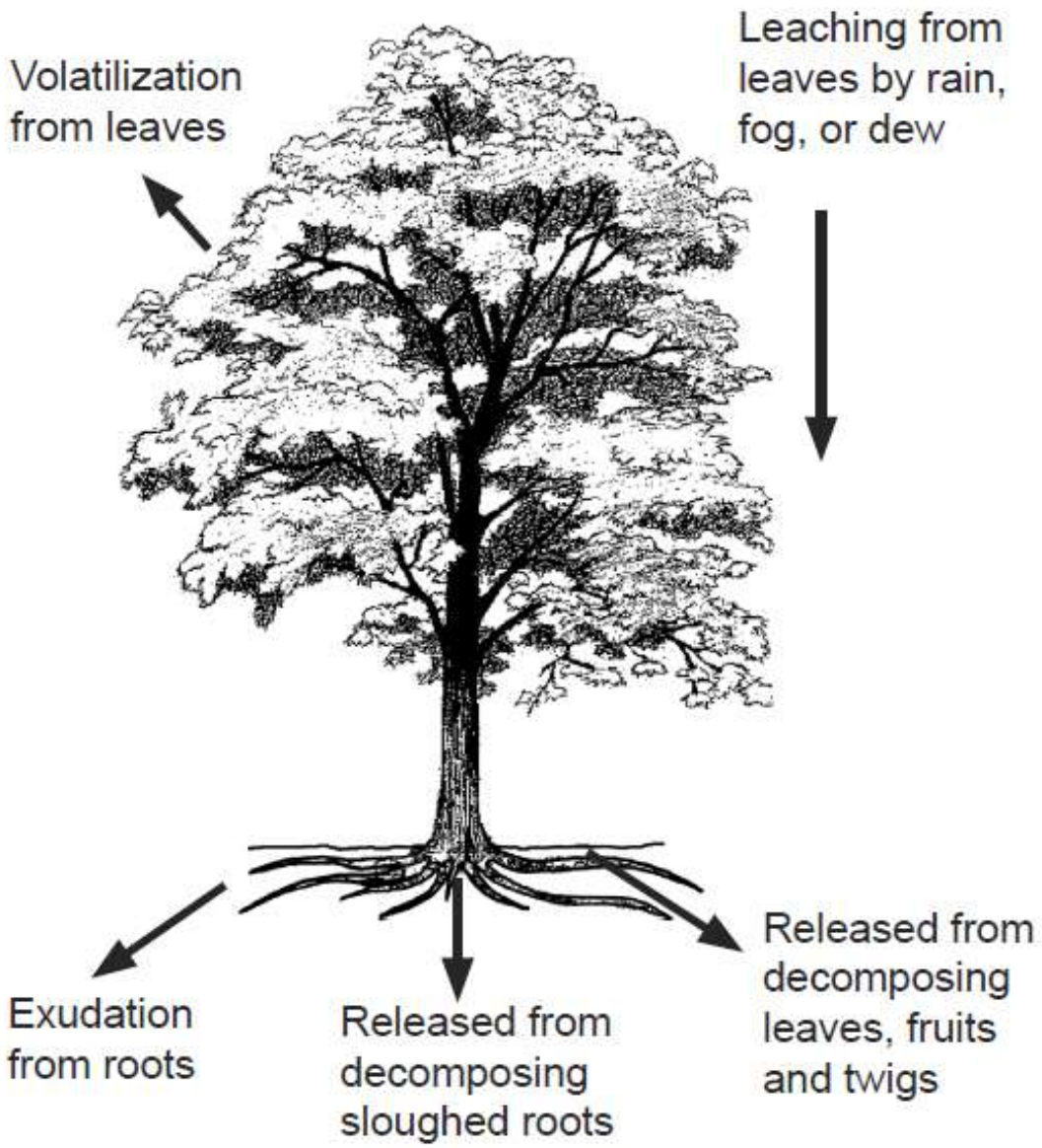
FIGURE 3 | Established and proposed emerging mechanisms of Brazilian pepper tree invasion in Florida and USA.

(Dawkins, 2016)


Big Canyon Nature Park, Orange County

Allelopathy

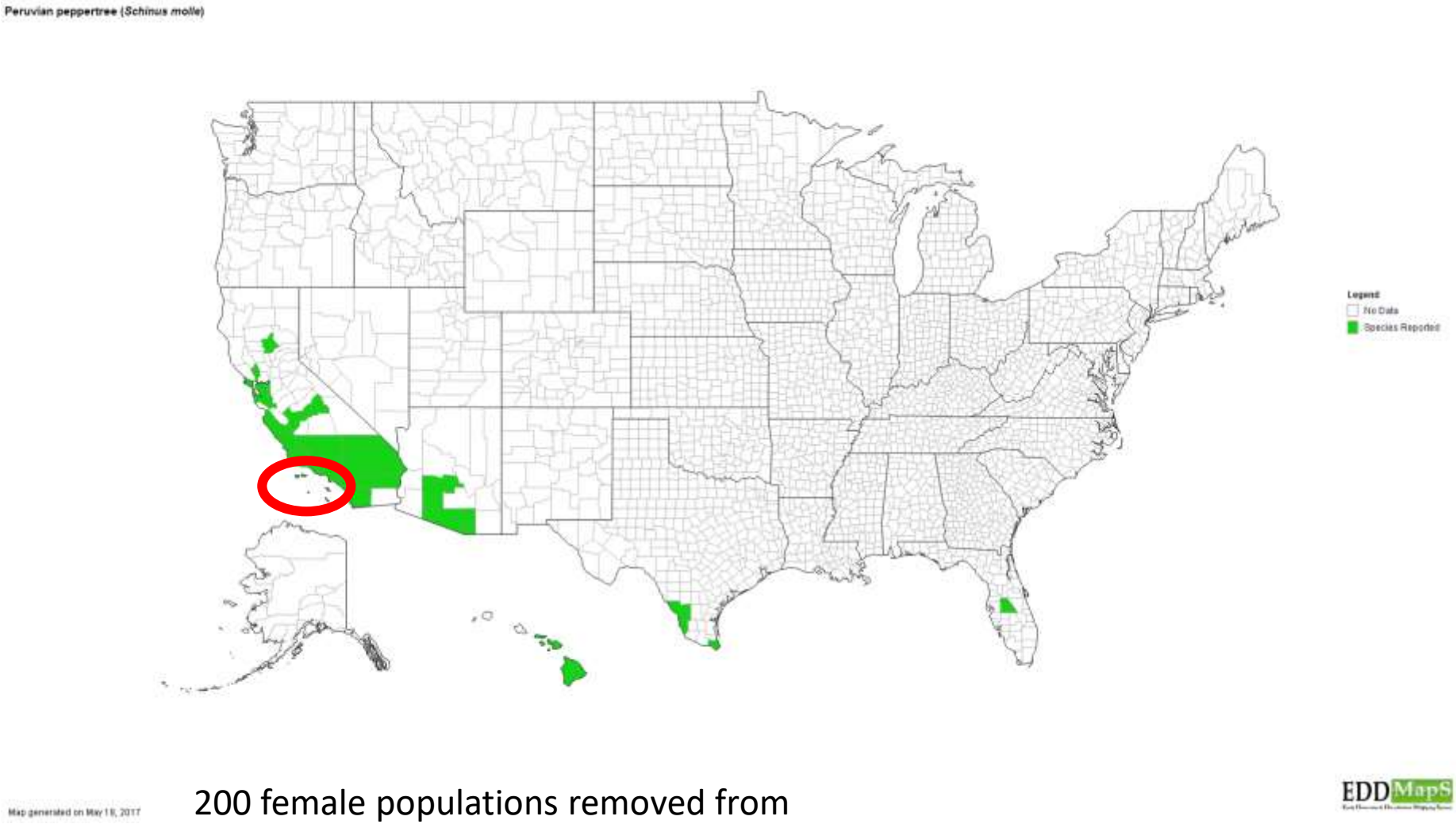
Soil Legacy



Juglone production from walnut tree

(Jose, 2002)

Peruvian peppertree



200 female populations removed from the Channel Islands National Park

(Cory & Knapp, 2014; EDDMAPS, 2017)

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EDITORIAL · 04 DECEMBER 2017

Grows well in sun and warmth — and shade and cold

Trees and shrubs could be less fussy about the climate than scientists thought. That might be good news as the planet warms.

Invasive plants such as the Peruvian pepper tree (*Schinus molle*) could be less particular about climate than was thought. Credit: Guillermo Lopez Barrera/Alamy

Officially, Peru's [illegible] officially, its most significant co[illegible]bably the pepper tree. Before the [illegible] southern California

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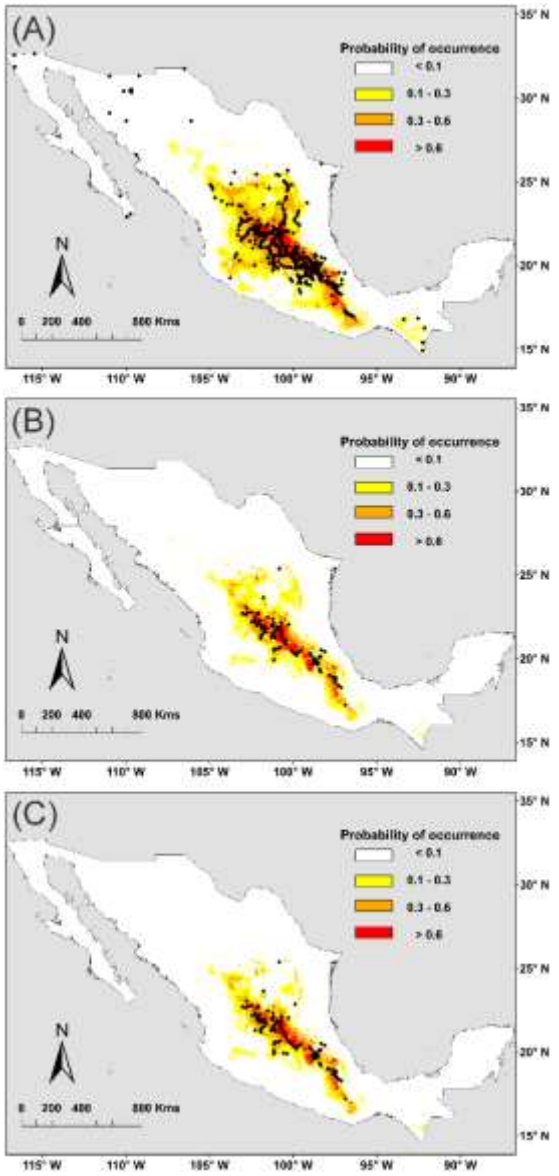


(Avendaño-González, 2016; Ramírez-Albores et al., 2016)

Voorhis Ecological Reserve
Cal Poly Pomona, Pomona

Sycamore Canyon Trailhead
Puente Hills Preserve, Whittier

Research Questions

1. Do either genders of the Peruvian pepper tree exhibit direct allelopathy from leaf litter in Southern California plant communities?

2. What is the likelihood of a soil legacy effect for the Peruvian pepper tree?

3. Can we use and manage pepper trees for the benefit of native plant communities?

Predictions and Hypothesis

- We predicted that the pepper tree treatments would be non-selective and will reduce the germination and dry biomass of all six species.
- We expected that soil and mulch of male plants will be more allelopathic than female plants (Avendaño-González et al., 2016).

Mulch & Soil Experiment

Brassica nigra
(Black mustard)

Amsinkia intermedia
(Fiddleneck)

Bromus madritensis
(Foxtail brome)

Phacelia ramosissima
(Branching phacelia)

Silybum marianum
(Milk thistle)

Stipa pulchra
(Purple needle grass)

Allelopathic Mulch

Female Fruits 30 g
Female Leaves 30 g

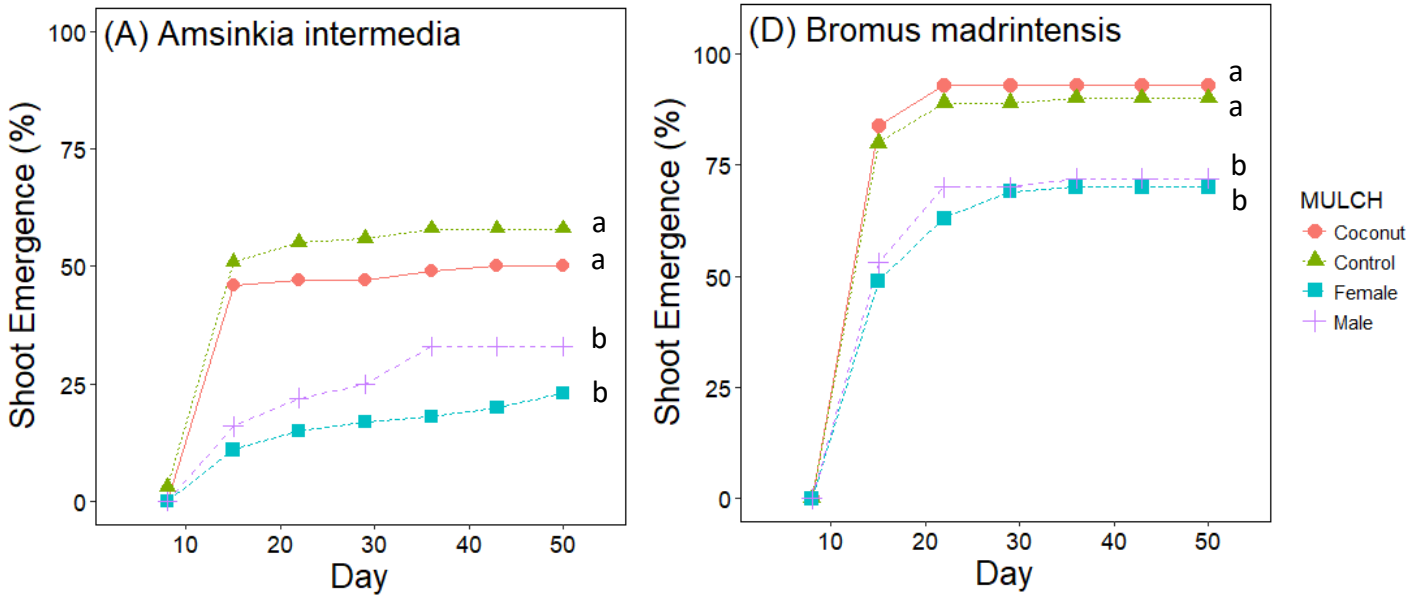
Male Flowers 30 g
Male Leaves 30 g

Field Transects

- Chino Hills State Park
- Puente Hills Preserve
- Voorhis Ecological Reserve

Stipa lepida Puente Hills

Results—mulch germination



No Significant Differences

B. nigra

S. marianum

S. pulchra

P. ramosissima

Mulch Type

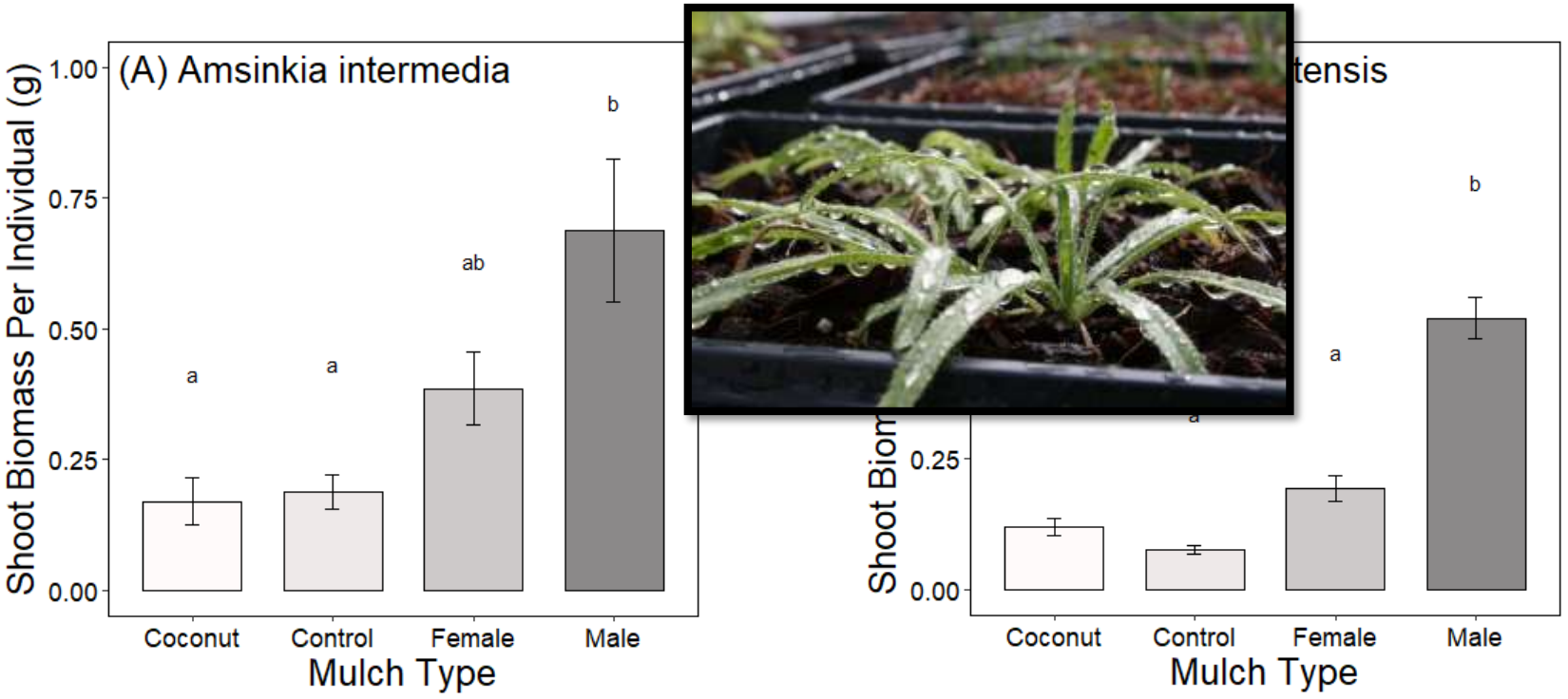
Coconut

Control

Female

Male

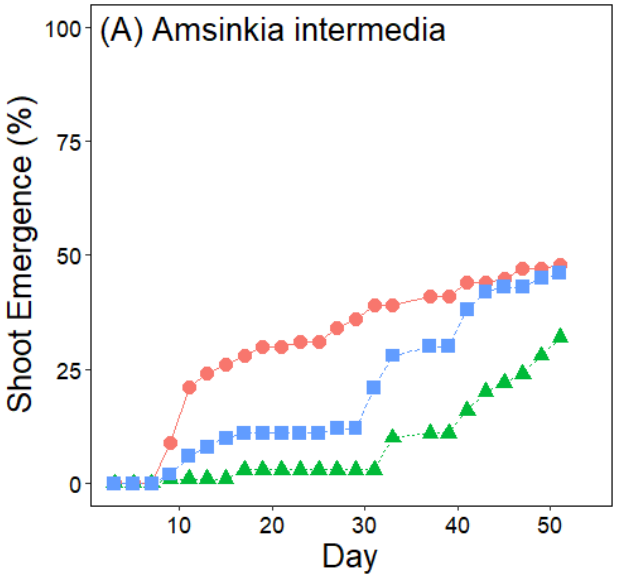
Results—mulch biomass

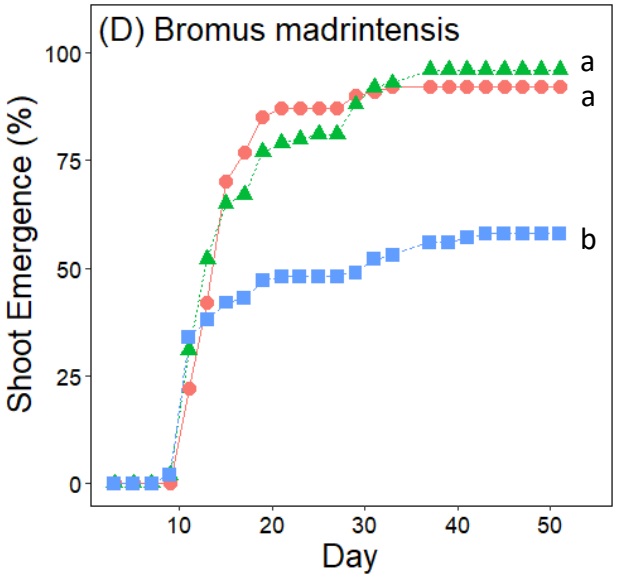


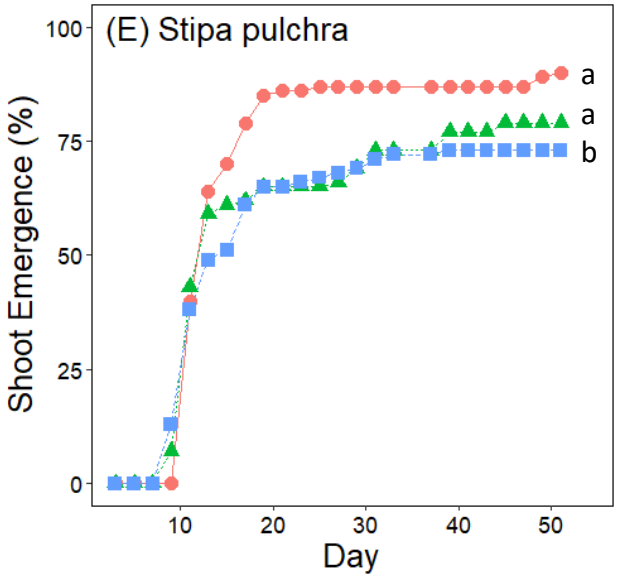
Native Biomass		
A. Intermedia	Root	Shoot
P. Ramosissima	Root	Shoot
S. Pulchra	Root	Shoot

Invasive Biomass		
B. madritensis	Root	Shoot
B. nigra	Root	Shoot
S. marianum	Root	Shoot

Results—soil germination







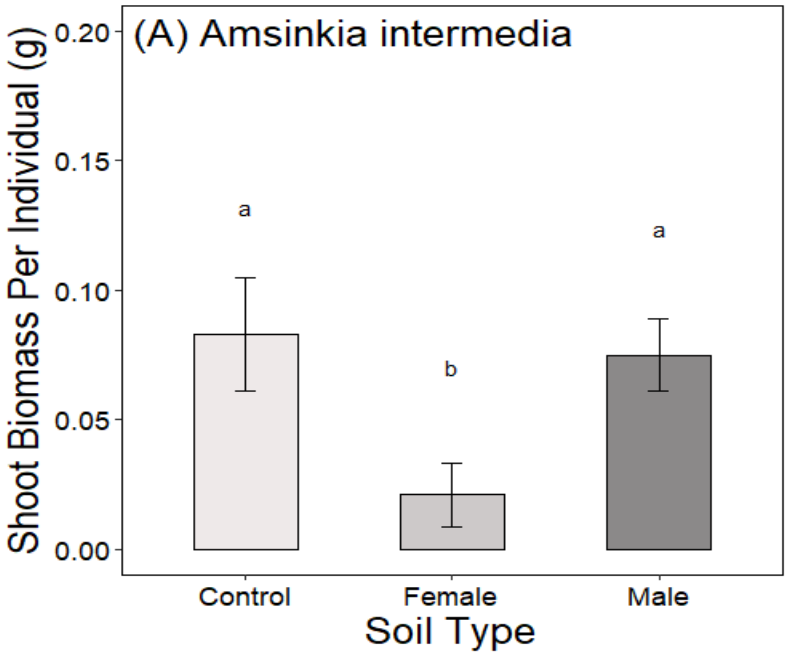
No Significant Differences

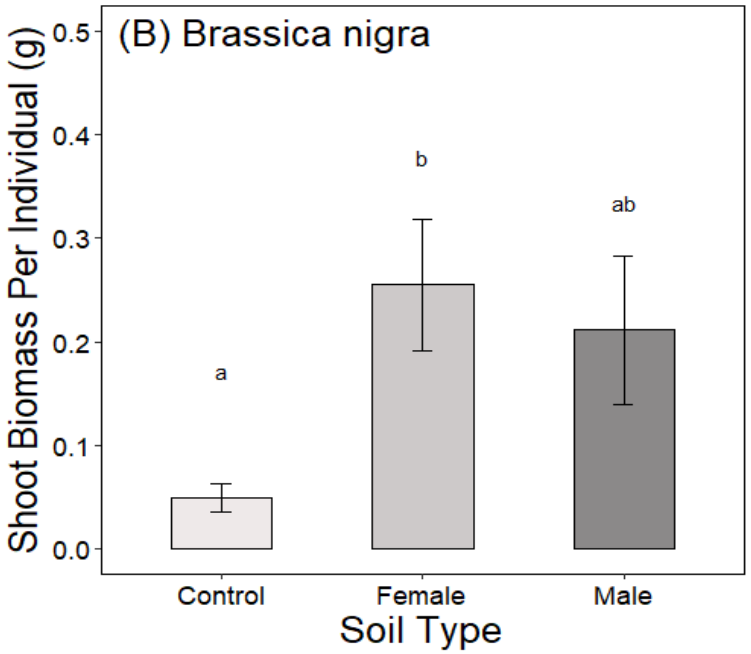
B. nigra	18-24 %
P. ramosissima	10-25 %
S. marianum	65-76%

Soil Type

- Control
- Female
- Male

Results—soil biomass





Native Biomass

A. intermedia	Root	Shoot
P. ramosissima	Root	Shoot
S. pulchra	Root	Shoot

Invasive Biomass

B. madritensis	Root	Shoot
B. nigra	Root	Shoot
S. marianum	Root	Shoot

20 native and 10 invasive plant species
Stipa lepida (Foothill needle grass)
Phacelia ramosissima (Branching phacelia)

Takeaways & implications for management

- Allelopathy and soil legacy effects are not as pounced as the Brazilian pepper tree
- Male mulch had a positive effect on growth depending on species

- We can prune existing populations to encourage native species
- Focus on removing female pepper trees first to avoid further spreading

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Interactions between the invasive *Schinus molle* (Peruvian pepper tree) with six plant species commonly found in Southern California nature reserves

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ABSTRACT

Since Schinus molle (Peruvian pepper tree) was brought to Southern California, the dioecious tree has been widely adopted in urban forests and has become invasive. Prior to our study, it was unknown whether S. molle influences plant species in its understory through allelopathy as it does in other geographic areas. The present study sought to determine if S. molle has negative effects on three native and three non-native, invasive understory species. For two separate experiments seeds of six plant species were sowed in mulch (leaf litter) and


PALOS VERDES PENINSULA
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MENTORES
Mentoring, Educating, Networking, and Thematic Opportunities for Research in Engineering and Science

Questad Lab
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