Up a Creek without an EDRR Program

How to spot weeds early on the invasion curve & do something about them

Valley Water

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Background & Intro

- Santa Clara Valley Water District provides flood control and water supply for Santa Clara County
- Urbanized lower watershed on valley floor plus some upper watershed land (= all the weeds)
- Invasive plant management for access, flow conveyance, fire prevention, mitigation
- Veg Field Operations: unit with project managers, administrators and maintenance workers
  - My official program removes established invasives (arundo, poison hemlock, ivy, etc.) for mitigation
  - 50% of my time is spent hiking and looking at plants over 500 acres of project lands → ad hoc early detection, rapid response
  - EDRR program is under development






About 30 new-to-the-area weeds

- Over the past ~5 years
- Plus new species of uncertain impact
- A handful of new ones every year
- This year's unwelcome newcomers: annual mercury, shining geranium, Amazon frogbit

Part 1: How to be a super spotter

- Even informal EDRR can find and prevent new weeds from spreading
- Detection can be the hang up
- Most new weeds are not particularly flashy
- Luck is part of it, but there are things you can do to increase your odds of spotting something new

Mercurialis ambigua - discovered while yanking eggleaf spurge

Bromus tectorum from contaminated hydroseed mix

First: know your plant community

Fumaria capreolata and *F. muralis* growing with each other

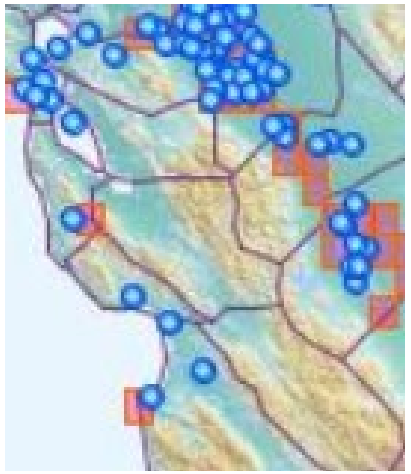
- To spot things that don't belong, know what is normal at your sites
  - Natives, naturalized, weeds
  - Yes, even the grasses
  - At different phenologies
- Can you distinguish between plants that look alike? Things in the same genus?
- When you regularly know all the plants at your sites, you're ready
- May take a couple years
- "I don't know that one" or "That looks weird" preceded almost every early detection
- Spend more time staring at plants in the field!

Next: prime your mind

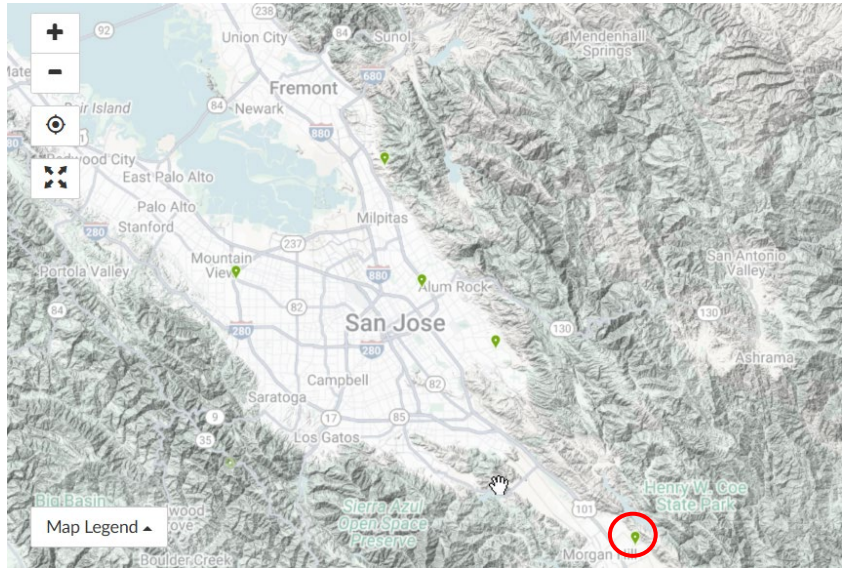
- What weeds are in nearby areas but not yours?
  - CalFlora alerts for new weeds to the area ("Undetected Bay Area Cal-IPC species," custom weed lists, etc.)
  - iNaturalist observations (some weeding required)
  - No need to memorize EDRR lists, but pay attention to 1-2 diagnostic characters
  - Rare to recognize a new plant in the field from a photo
- Follow up on new leads from iNat, CalFlora, and other sources

Oncoiphon pilulifer: one of few EDRR weeds I recognized immediately from photos

Water hyacinth



CalFlora distribution map



iNaturalist distribution map

Examples of diagnostic characters

- Gestalt is sometimes enough
- A character can be helpful for recognizing differences & teaching others
- Vegetative characters are less time sensitive
- Jepson & other floras call diagnostic characters out

Bisexual flowers on *Clematis vitalba*

Downward pointing hairs on *Chondrilla juncea*

Purple dots on *Lythrum junceum*

Lanceolate bract on *Ludwigia hexapetala*

Short styles on *Hypericum androsaemum*

Aerenchyma on *Limnobium laevigatum*

Reticulate root fibers on *Chasmanthe floribunda*

Horizontal wrinkles on *Geranium lucidum* sepals

Botanize your crew

- Veg maintenance workers are an EDRR resource
- Formal botany skills not needed for detection
- Not everyone will be great at plant ID, but mentor those who are
- Plant education, shared fieldwork
- Be a botany resource for crew
- MW Roberto Garcia texted me a plant photo. "Hey Jen, what's this plant?"
  - It was skeletonweed (*Chondrilla juncea*) – first sighting on Valley Water land
  - 3 years of later, we couldn't find it this year
  - Eradicated?!

Hermilo treating *Ludwigia hexapetala*

Plant ID game at a unit meeting

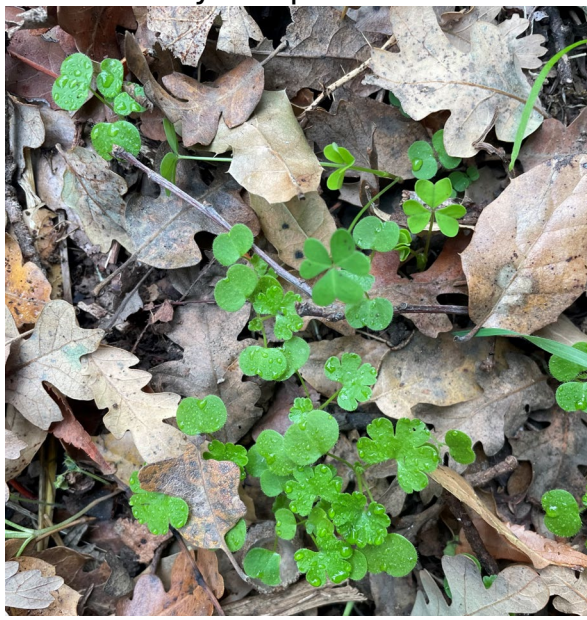
Other early detection species found by crew

- *Euphorbia oblongata*, *Araujia sericifera*, *E. characias*, *Plecostachys serpyllifolia*, *Limnobium laevigatum*
- Most were new species I had never mentioned
- A few were species I asked crew to look for

Embrace the AI overlords (at least one of them)

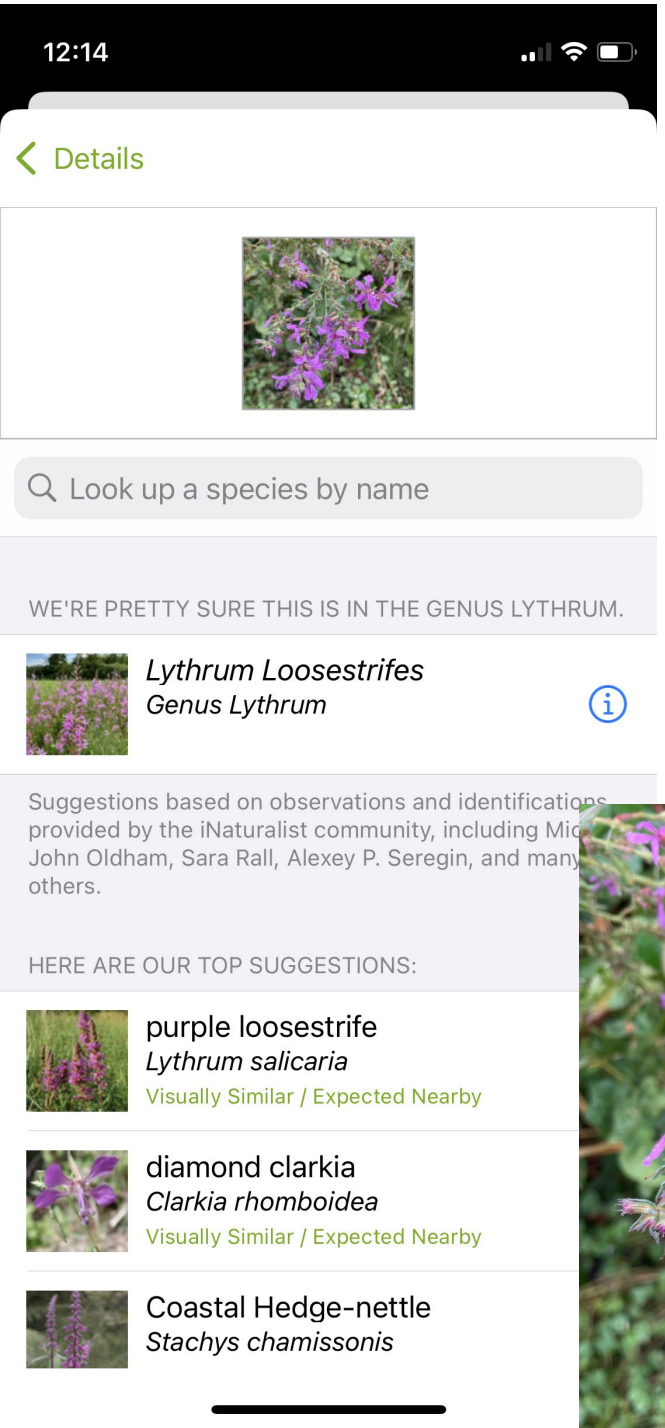
- iNaturalist is a game changer for plant ID
  - AI photo matching ~79% accuracy, human-confirmed ~95%
  - Can be used without social media component
  - Generally accurate to genus
  - ID when diagnostic characters are not present
  - BUT needs cell service to work
- Combine with traditional botany skills to improve time and accuracy of ID in the field; immediate action possible
- Includes species not in Jepson or CalFlora: ornamental escapees, non-local weeds
- A great tool for crew, too

Geranium lucidum seedlings: not a keyable phase



Veronica cymbalaria: not in Jepson or CalFlora

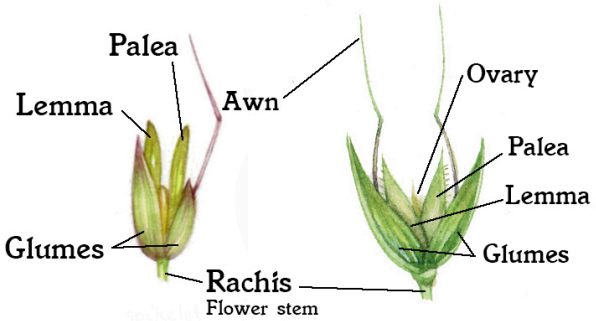
Quick & dirty hybrid process for field ID



- Take a bunch of photos
  - Hand or ruler for scale
  - Landscape / overall plant
  - Leaves, attachment, flowers, fruit
- Run through iNat, selecting different photos (‘default’) to generate different results
- Narrow the possibilities with your own knowledge
- If the photos generate the same top result, look at the genus key
- Take a specimen, too

Don’t fear the Jepson

- Making a positive ID is part of IPM
- Keying in the digital age
- Look up any term you don’t understand to find a helpful image
- CalFlora photos of key characters
- E-Jepson: run through key in the field to confirm or grab the right parts for later
- Stuck? Get help from iNaturalist or CalFlora communities
- Everyone gets it wrong sometimes



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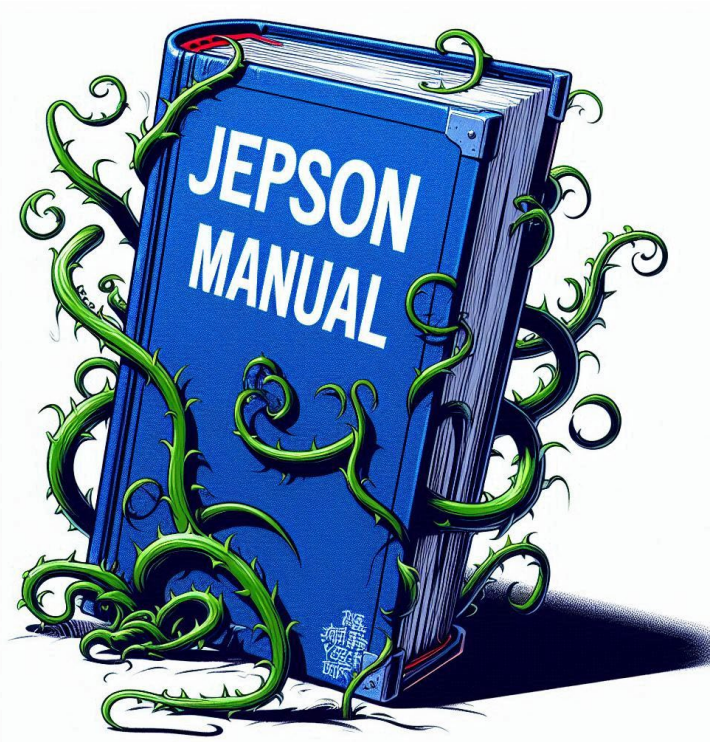


Key to Paspalum

View taxon page for Paspalum

(For a list of species in Paspalum, use the above link.)

Jepson Manual glossary definitions can be seen by moving your cursor over words underlined with dots.

1. Margins of upper glume and sterile lemma glabrous; inflorescence digitate; spikelets single

2. Upper glume pubescent on back ..... P. distichum

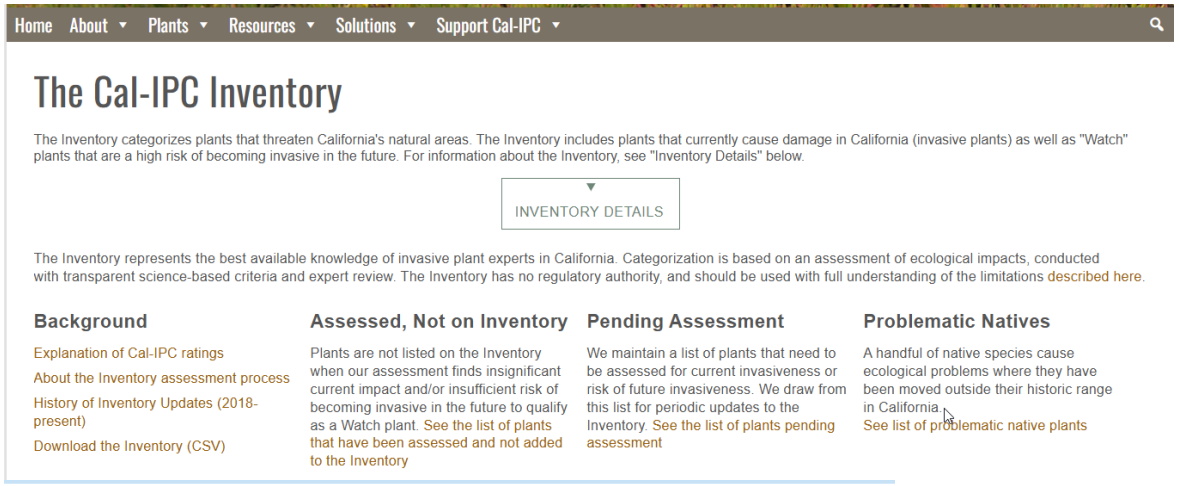
2' Upper glume glabrous on back ..... P. vaginatum

1' Margins of upper glume and sterile lemma long-silky-hairy; inflorescence a raceme; spikelets paired

3. Racemes 2–7; spikelets generally >= 3 mm ..... P. dilatatum

3' Racemes generally 10–30; spikelets < 3 mm ..... P. urvillei

Part 2: You found something new. Now what?



CDFA Weed Pest Ratings and CCR 4500 Noxious Weeds as of June 22, 2021

Scientific Name	Common Name	CDFA Pest Rating	CCR 4500 Noxious Weed
A' Rated Weeds			
Alternanthera philoxeroides	alligatorweed	A	x
Arctotheca calendula	capeweed, as fertile or seed bearing plants	A	x
Baccharis halimifolia	sea-myrtle	A	
Carrichtera annua	Ward's weed	A	
Chrysanthemoides monilifera	bitoubush	A	
Clematis vitalba	old man's beard	A	
Crupina vulgaris	bearded creeper	A	x
Dittrichia viscosa	false yellowhead	A	
Echium plantagineum	Paterson's curse	A	
Enchylaena tomentosa	ruby saltbush	A	
Euphorbia hypericifolia	graceful spurge	A	
Euphorbia myrsinites	myrtle spurge	A	
Fallopia spp. (Bohemian, giant, and Japanese knotweeds) see Reynoutria	Bohemian, giant, and Japanese knotweeds	A	x
Galega officinalis	goatsrue	A	x
Geranium lucidum	shining cranesbill	A	

- Make a positive ID
  - Not in Jeps? Try Flora of N. America, Google Scholar for keys
- Check in with Cal-IPC, CDFA, CAC
  - Evaluated? Should it be?
    - On Cal-IPC inventory or other categories?
    - CDFA 4500 noxious weeds + regional targets
  - Any suggestions for dealing with it?
- Let the weed community know
  - Educate your organization
  - Reach out to your local WMA
- Figure out how to deal with new weed

Lessons learned for the next program

- A dedicated program is needed
- Plant list must be flexible
- Survey and treat at the same time
- Adaptive management: it takes a few years of flailing to learn how to manage a weed
- Timely detection makes a difference in the spread and impact of new weeds
  - Good riddance, stinknet, skeletonweed, chasmanthe!
- Eradication is hard even for species early in the invasion curve

The only known population of Japanese knotweed in Santa Clara Co; going on year 3

Crown daisy – the battle continues

In summary

1. Learn your regular plants
2. Spot the weird ones
3. Engage your crew
4. Use iNat & e-Jeps to ID in the field
5. Take action
6. Use lessons learned to build a better program

Questions?

With appreciation for Veg Field Operations staff

In memoriam Joel Palafox

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