



Thoughtful Weeding



How to identify weeds, review techniques, and what to do with the monsters when you're done

One Weed Definition: a plant in the wrong place

Non-native annual grasses

Escaped ornamentals and introduced agricultural and forage plants, trees like eucalyptus

The occasional native!



California poppies overtake my carrots in a flash

The magic of Oaks

Occasionally a “weed” if close to the house

Everywhere else, a keystone species supporting hundreds of other species

Jays can distribute acorns up to a mile away

And so can you



Fresh start: Worst case scenario

Disturbed landscape, plants and topsoil scraped off for building pad and yard

Ripe for invasive plants that relish a disturbed site, pioneer weeds

30'x30' area of bare ground=900 sq ft

Weed 3'x3'= 9 sq ft per day and you are done in 100 days!



At least it can support plant life

Weeds proliferating means that at least your site can support plant life

Disturbed sites need TLC to be brought back to life

Here, 70 years after a mining operation, only mosses eke out on the surface - no roots



Think Replace, not Remove

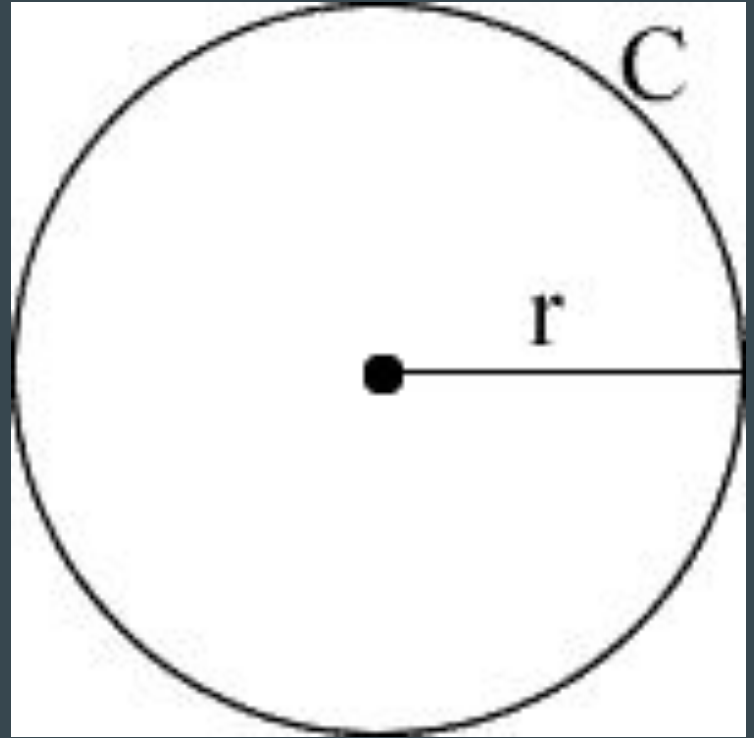
Any weed you remove will be replaced in a flash by the seed bank

Plant a desired plant (my preferences, natives and edibles) in its place

Defend your new plant from weeds while getting established

6' diameter shrub gives you a surface area of 28 square feet, πr^2

That's three days of weeding!



r = radius

d = diameter

C = circumference

A = area

π = pi = 3.1415926535898

Shrubs and groundcovers snuff out weeds

Arctostaphylos densiflora

Spreads to 6' wide = 28
square feet of coverage

Exactly one weed at 12
o'clock pulled out easily =
three days of weeding



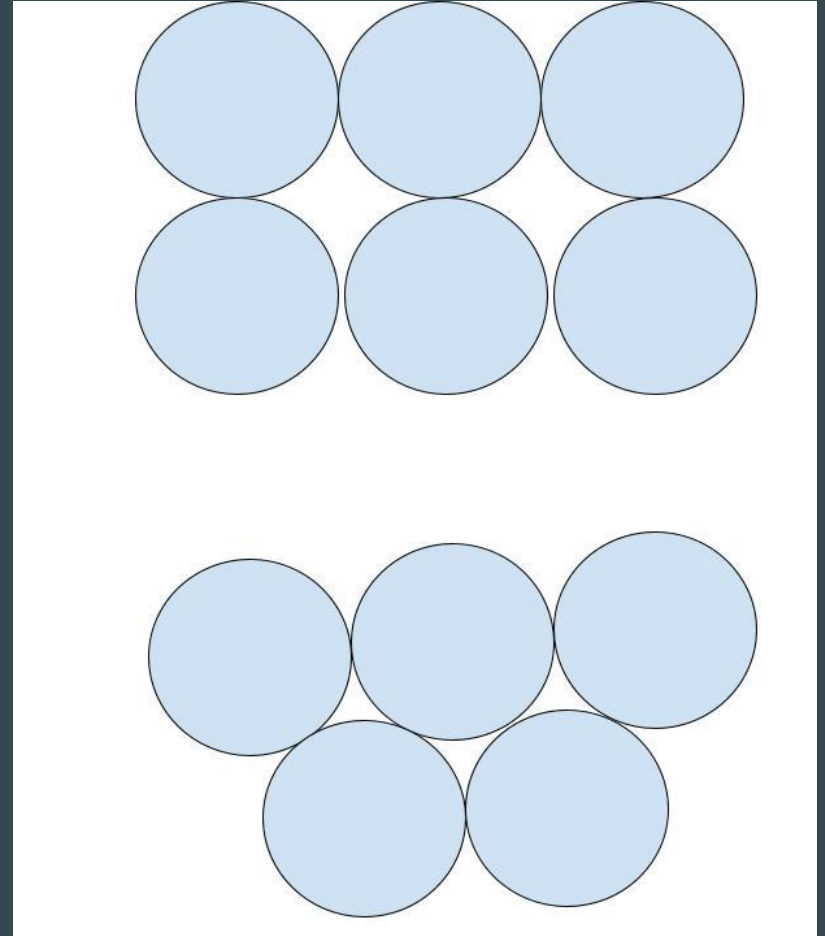
Sidebar

Respect the dimensions posted

If 6' diameter, plant 6' apart, even if it is puny now

Just like social distancing, plants need space

Can place randomly or offset, but generally not like a tic tac toe board



Those Clever Weeds

Self Sowing Seeds: Filaree

Flying Seeds: Cardamine, each plant can produce 600-1,000 seeds

Horrible seeds: Foxtails



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Whole plant
Harry Rose
CC BY 2.0

And you thought only you had this challenge

Check out Common mullein

223,200 seeds per plant

30 year survival in the soil -
meaning it can germinate if
brought up to the surface by
a plow

Table I. Examples of weed seed production and length of seed survival in soil of weeds found in Nebraska.

Weed species	Number of seeds ^a produced/plant	Length of seed ^b survival in undisturbed soil (years)
Ball mustard	490	10
Canada thistle	680/stem	21
Common cocklebur	900	8
Common lambsquarters	72,450	39
Common mullein	223,200	39
Common purslane	52,300	30
Common ragweed	3,380	39
Common sunflower	7,200	8
Curly dock	29,500	39
Curlycup gumweed	29,700	10
Dandelion	15,000	6
Devils beggarticks	7,000	10
Downy brome	700	2
Field pennycress	7,000	8
Great burdock	31,600	21
Green foxtail	34,000	39

<https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=2496&context=extensionhist>

The Amazing Dandelion

Is it really a weed?

Lawns used to be polyculture, not monoculture

Clovers are nitrogen fixers, giving nutrition to their neighbors

Flowers provide pollen and nectar to birds and bees

Turn your lawn into a grassland - 50% annual and perennial flowering plants



Image from LebanonTurf - one provider of broadleaf herbicide

Dandelion as Supreme Engineer

Flower upright to encourage pollinator visit

Turn downward during seed development

Turns upward again for seed release

Pappus on seed is the parachute for dispersal

Guides seed into the ground at the proper angle for barbs to engage and secure seed



Dandelion Disdain

Socially unacceptable

Monoculture lawn became fashionable after development of selective herbicides

Monoculture lawn so hard to maintain, plastic is current replacement

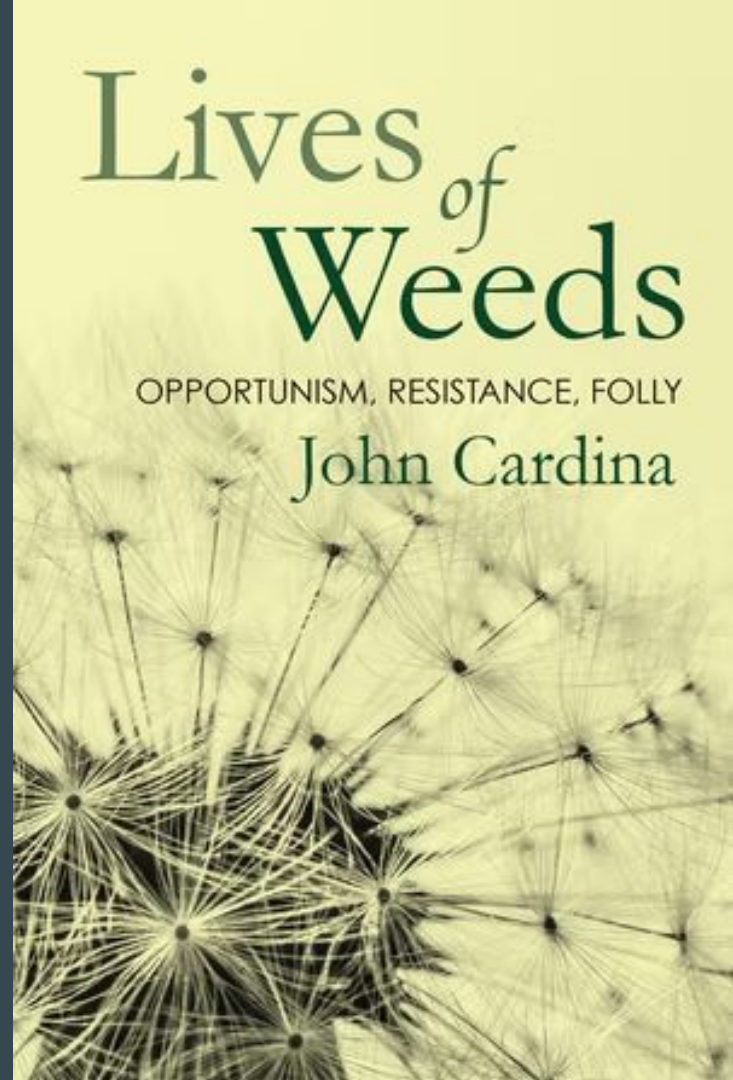
Easy control - no mow lawn shades out dandelions except at edges, where you can admire their miraculous features

\$900,000 to control, really?

Lives of Weeds

OPPORTUNISM, RESISTANCE, FOLLY

John Cardina



Sidebar

Grasses do have flowers, often quite beautiful, just no petals

Wind pollinated

No purpose for petals which serve as “EAT HERE” signs for pollinators, but grasses serve as host plants

Most grasses in my garden are weeds, except I did find one native bunch grass:

Nassella pulchra



California Grassland Habitat

California Native Grasslands Association , cnga.org,
note these benefits:

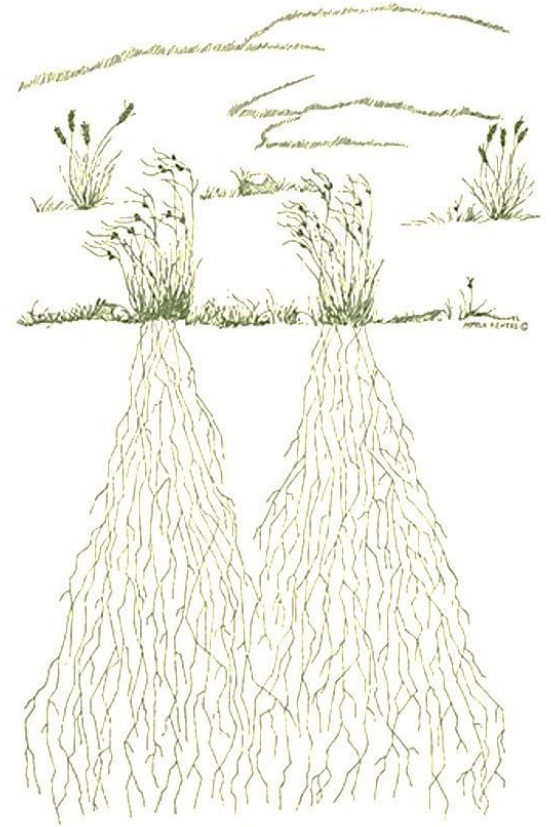
Carbon storage below ground, fire safe

Water filtration and storage, flood and erosion
prevention

Supports biodiversity of other plants and multitude
of animals

All our activities, agriculture, urban and
suburbanization, have reduced native grasslands by
99%

300 species of native grasses to choose from, none
of them “weeds”



**An astounding 90% of California's rare and endangered
plant species reside in grasslands (Skinner & Pavlik, 1994)**

Design a plant

Photosynthesis: creates sugars for nutrition and cellulose for structure

Plant's goals: grow, flower, pollinated, seed production, reproduce

Plant's gifts: Produces food for insects which birds need, other animals, fungi, most bacteria which are essential for topsoil formation and new plant growth

Oxygen, anyone?: Releases oxygen from water and absorbs carbon dioxide



Design a plant for Herbivores

Tops break off cleanly, above the growth points

Roots have stored carbohydrates to provide nutrition to regrow the missing leaves

Roots strong enough to not be disturbed by grazing



Exactly the Characteristics to make weeding *nearly* impossible

Tops breaks off cleanly, above the growth points

Roots have stored carbohydrates to provide nutrition to regrow the missing leaves

Roots strong enough to not be disturbed by weeding



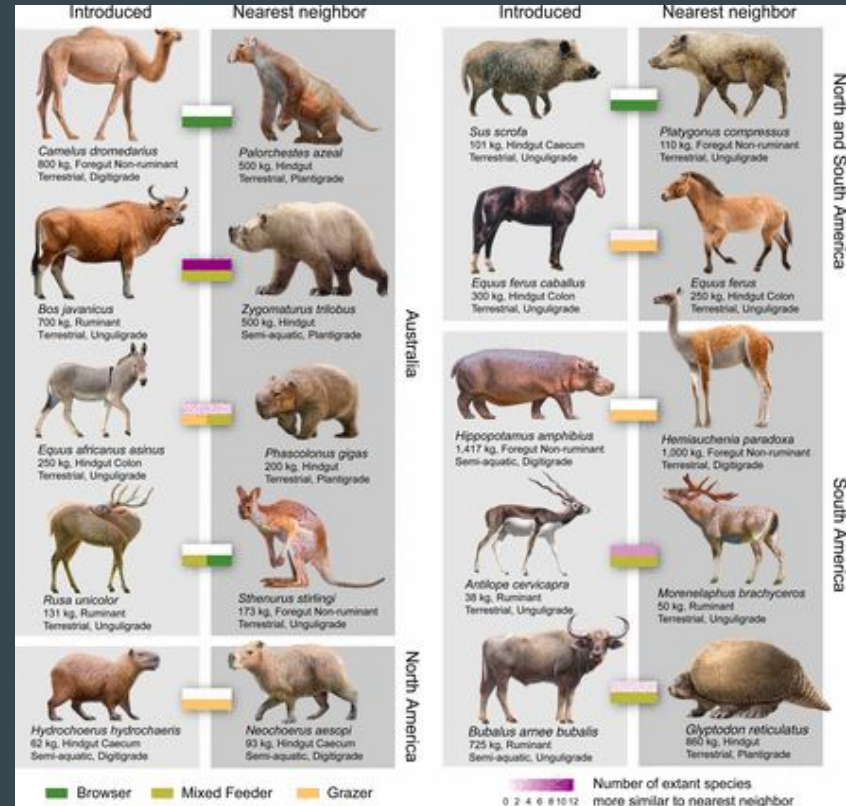
Grasses and other monocots have fibrous root system

Prehistoric Grazers

Late Pleistocene grazers now largely replaced by introduced species, cows, sheep, goats

Evolutionary pressure for grasslands, resilient plants tolerant to successional grazing

Introduced herbivores restore Late Pleistocene ecological functions,
Lundgren et al, PNAS



Alternative to Pulling

Hoe larger areas

Sod cutter with serrated edge can saw through roots

Just ¼” below the surface will do it.

A rare plant can regrow from root nodules or dormant buds

Roots left in the soil decompose and enrich the soil



Hoe Hoe Hoe

Paddle hoe - heavier narrow version for tough spots

Stirrup Hoe - gets those tiny weeds in your gravel paths

Onion hoe - narrow for vegetable beds

Dutch hoe - pointed for even tighter spots

Handheld Japanese gardening tools



Residue Management

Fancy term for the stuff
you are removing from
your garden

Green Can

Home composting

Leave in place



Case IH 3100 Series II Rigid and Flex Draper Headers

No Tractor? Keep weeds and leaves

Free mulch, like duff in native landscapes

Retains moisture

Reduces erosion from water and wind

Slow decomposition over the years during the wet season

Encourages microbial biomass and provides insect habitat

Builds topsoil

Slows weed growth

Quercus lobata and *Ribes viburnifolium*



Avoid Forever Plastic - My Two Cents

Weed barriers work short term

Tiniest layer of dust and leaves support weed germination above barrier

Roots penetrate and make them nearly impossible to remove

When they breakdown, they add to the microplastic burden



Plastic Alternative - Sheet Mulching

Cardboard overlapping to smother weeds

Layers of animal bedding, manure, wood chips, leaves, straw, crop waste with mulch as final layer

Water each layer

Plant perennials immediately, annuals after a year



How Long do you Keep Weeding?

Forever

Seed bank seeds germinate years later in succession

Seeds blow in from neighbors

On the other hand, you may notice native plants returning as well!

iNaturalist, Seek, Picture This, CalFlora and CalScape

Hikes with experts at regional parks and California Native PLant Society



Free gift of *Claytonia perfoliata*, miner's lettuce, among the weeds

Shoot first, pull later if a weed

Spotted this tiny flowering plant in August, hundred yards away from any irrigation

Uploaded image to iNaturalist and found a match, native to boot!

Skunkweed *Navarretia squarrosa*



What am I Missing?

No mention of anything that rhymes with “CIDE”

No mention of pre-emergents, post-emergents, dissicants, even organic herbicides

Organic herbicides have some effectiveness on tiny weeds, less than 12 DAYS old, and much less if even 26 days old

Farmers find resistant weeds in a year or two

University of California, Division of Agriculture and Natural Resources

UC Nursery and Floriculture Alliance

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Organic Herbicides - Do They Work?

by W. Thomas Lanini

In recent years, several organic herbicide products have appeared on the market. These include Weed Pharm (20% acetic acid), C-Cide (5% citric acid), GreenMatch (55% d-limonene), Matratec (50% clove oil), WeedZap (45% clove oil + 45% cinnamon oil) and GreenMatch EX (50% lemongrass oil). These organic products can be effective in controlling weeds, but there are limitations. In this article, I will summarize the information that we have learned from trials on the efficacy of these herbicides and economic considerations for commercial use. Although these products are of interest for use in sustainable production systems, organic growers should always check with their organic certifier in advance of the intended application as such use of the alternative herbicide may not be cleared by all agencies.

Weed Control and Selectivity

Organic herbicides kill weeds that have emerged but have no residual activity on those emerging subsequently. Further, while these herbicides can burn back the tops of perennial weeds, perennial weeds recover quickly.

University of California Nursery and Floriculture Alliance (UCNFA)

Take Home Points

If a plant is not happy, not growing robustly, consider moving and replacing

Some plants have a slow start establishing roots

It will never outgrow the weeds if struggling

Respect plants preferences, sun/shade/dry/moist

Allocate a specific time for weeding, not a portion of the garden. Often, what you plan is not achievable and leads to frustration

Sometimes procrastination works - few big weeds instead of hundreds of tiny ones

Invite your friends to pull weeds with you when they visit



Harvest Time

Questions?

