Low Desert Weeds with special emphasis to yellow nutsedge

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- Common low desert weeds
- Sedges in the low desert
- Weed management approaches

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What is a pest?

- Pests are organisms that damage or interfere with desirable plants in our fields and orchards, landscapes, or wildlands, or damage homes or other structures.

- Pests also include organisms that impact human or animal health.

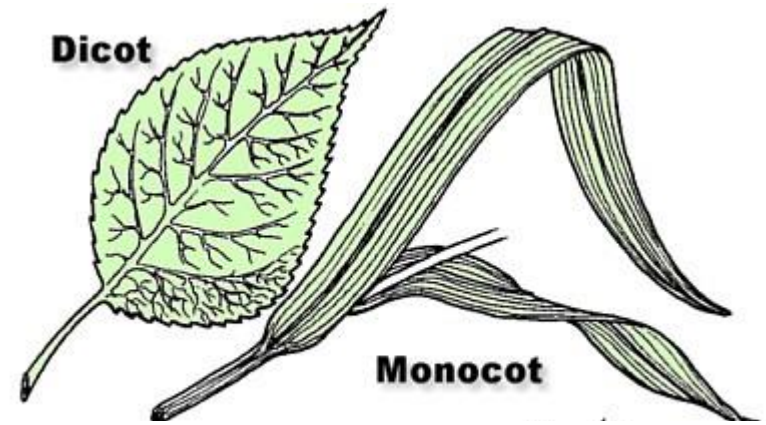
- A pest can be a plant (weed), vertebrate (bird, rodent, or other mammal), invertebrate (insect, tick, mite, or snail), nematode, pathogens (bacteria, virus, or fungus) that causes disease, or other unwanted organism that may harm water quality, animal life, or other parts of the ecosystem.

What are Weeds?

- The term "weed" means different things to different people.
- In broadest sense, it is any plant growing where it is not wanted.
- Weeds can be native or non-native, invasive or noninvasive, and noxious or not noxious.

Weeds are broadly divided into;

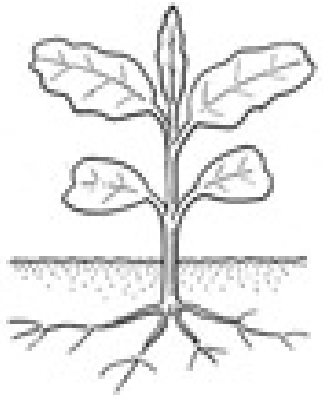
- broadleaf plants (dicotyledons) or
- narrowleaf plants (monocotyledons) – most are grasses, but also include sedges.



Broadleaf VS Narrowleaf

Identify your weeds

Broadleaf



Leaves are wide, veins branch out in different directions.

Grass

Leaves are narrow, arranged in sets of two; stems are rounded or flattened.

Sedge

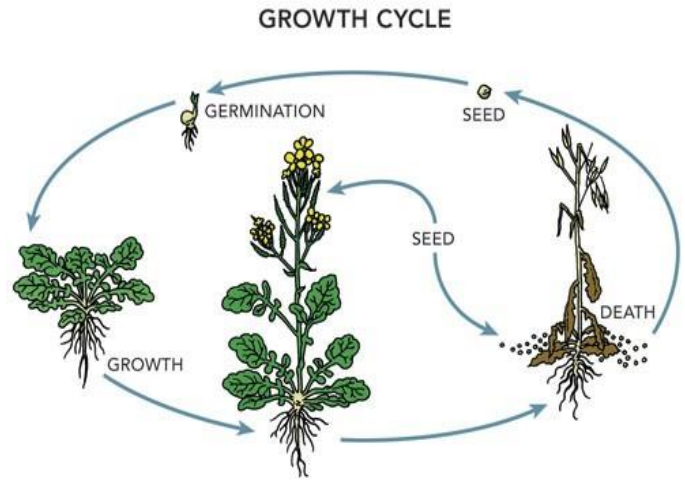
Leaves are narrow, arranged in sets of three; stems are triangular in cross section.

Aquatic

Plants that grow in water for at least part of their life cycle.

Weeds can also be classified based on their lifecycles

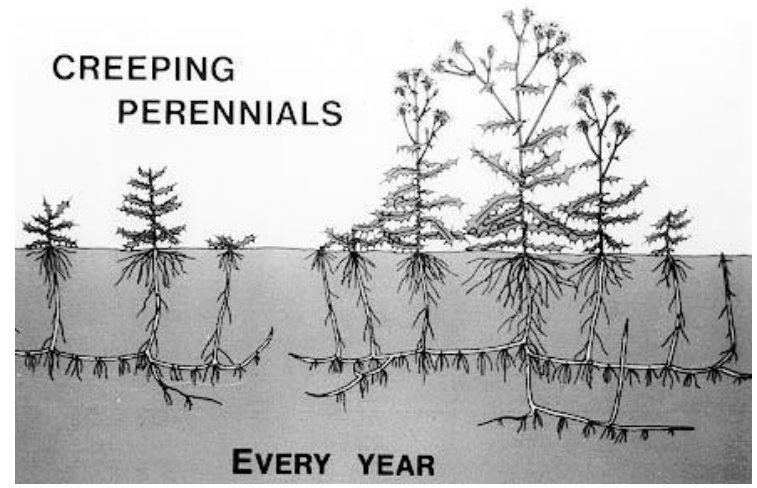
- **Annuals – complete lifecycle in one year**
  - **winter annuals**, germinate & grow mainly through winter & spring, & die in summer
  - **Summer annuals** germinate in spring, grow through summer & die as temperature drops. Irrigation can alter germination time & prolong life span of some annuals



- *Complete lifecycle in one year (seed, adult, seed)*
- *Seeds may remain dormant in soil for years (soil seed bank)*

- **biennials -** complete a life cycle in 2 years

- **perennials**; weeds that live for 2 years or more.
  - ✓ include bermudagrass, creeping woodsorrel, & nutsedges that persist through their vegetative propagules (*stolons*, *rhizomes*, *or tubers*).



- *Perennials persist year after year, &*
- *May go dormant during drought or cold weather*
- *Can sprout back if not removed or killed*

Major Weeds of the Low Desert

Bermudagrass (*Cynodon dactylon*)

- grown as a turfgrass or as forage for livestock but can also be an invasive weed.

- introduced from Africa (not Bermuda) in 1751 and is widely spread throughout the southwest & southern US

- common in gardens, landscapes, turf areas, orchards, roadsides, vineyards, & industrial areas.

- has many other common names including couchgrass, devilgrass, wiregrass, or dogtooth grass.

Purslane (Portulaca oleracea)

- Warm season
- Annual, Broadleaf
- Succulent stems, leaves can be edible (Ex *Verdolagas* – popular in Mexico)

Horse purslane

- Toxic!
- May be confused with edible purslane
- Has pink or purple flowers

Palmer Amaranth

- Warm season, Broadleaf
- Annual
  - One plant can produce a million seeds

Puncturevine

- Warm season
- Broadleaf
- Annual



Little mallow

- Cool season
- Broadleaf
- Annual or biennial
- Long taproot


Spurges

- Prostrate or hyssop spurges
- Warm season
- Broadleaf, annual


Russian Thistle

- Our most common tumbleweed
- Broadleaf, Annual
- Warm season

Annual Sowthistle

- Cool season
- Broadleaf
- Annual

Purple nutsedge

- Warm season
- Perennial, Narrowleaf
- Difficult to control

Annual Weed Seasonality–Deserts

Weed	Season	Commonly Survives Year Round
London Rocket	Winter	No
Sheperdspurse	Winter	No
Wild Mustard	Winter	No
Lambsquarters	Winter	No
Nettleleaf Goosefoot	Winter	No
Russian Thistle	Winter	Yes
Wright Saltbush	Winter	Yes
Fivehook Bassia	Winter	Yes
Annual Sowthistle	Winter	Yes
Silversheath Knotweed	Winter	Yes
Malva	Winter	Yes
Sweet Clover	Winter	Yes
Canarygrass	Winter	No
Wildoat	Winter	No
Annual Bluegrass	Winter	No
Common Purslane	Summer	Yes
Pigweed	Summer	No
Annual Morningglory	Summer	No
Groundcherry	Summer	No
Spurge	Summer	No
Sunflower	Summer	No
Dodder	Summer	No
Horseweed	Summer	Yes
Sprangletop	Summer	Yes
Watergrass	Summer	No
Foxtail	Summer	No
Cupgrass	Summer	No
Windmillgrass	Summer	No

Common Weeds profiled in *Southwest Desert Flora*

- *Achillea millefolium*, Common Yarrow
- *Alternanthera caracasana*, Khaki Weed
- *Alternanthera pungens*, Khakiweed
- *Amaranthus albus*, Prostrate Pigweed
- *Amaranthus blitoides*, Mat Amaranth
- *Amaranthus palmeri*, Carelessweed
- *Anthriscus caucalis*, Burr Chervil
- *Atriplex canescens*, Four-wing Salt Bush
- *Carduus pycnocephalus*, Italian Plumeless-Thistle
- *Centaurea melitensis*, Maltese Star-thistle
- *Centaurea solstitialis*, Yellow Star-thistle
- *Kali tragus*, Prickly Russian Thistle
- *Lactuca serriola*, Prickly Lettuce
- *Linaria vulgaris*, Yellow Toadflax
- *Malva neglecta*, Common Mallow
- *Malva parviflora*, Cheeseweed Mallow
- *Medicago polymorpha*, Burclover
- *Oncosiphon piluliferum*, Stinknet
- *Oxalis corniculata*, Creeping Woodsorrel
- *Oxalis stricta*, Common Yellow Oxalis
- *Pentzia incana*, African Sheepbush
- *Persicaria lapathifolia*, Curlytop Knotweed
- *Plantago major*, Common Plantain
- *Chenopodiastrum murale*, Nettleleaf Goosefoot
- *Chenopodium album*, Lambsquarters
- *Chenopodium ficifolium*, Fig-Leaf Goosefoot
- *Convolvulus arvensis*, Field Bindweed
- *Cuscuta indecora*, Bigseed Alfalfa Dodder
- *Eclipta prostrata*, False Daisy
- *Erodium cicutarium*, Redstem Stork's Bill
- *Herniaria hirsuta*, Hairy Rupturewort
- *Ipomoea barbatisepala*, Canyon Morning-glory
- *Ipomoea capillacea*, Purple Morning-glory
- *Ipomoea costellata*, Crestrib Morning-glory
- *Ipomoea hederacea*, Ivyleaf Morning-glory
- *Ipomoea longifolia*, Pinkthroat Morning-glory
- *Ipomoea ternifolia*, Tripleleaf Morning-glory
- *Polygonum argyrocoleon*, Silversheath Knotweed
- *Senecio vulgaris*, Common Groundsel
- *Sisymbrium irio*, London Rocket
- *Solanum elaeagnifolium*, Silverleaf Nightshade
- *Solanum rostratum*, Buffalobur Nightshade
- *Sonchus asper*, Spiny Sowthistle
- *Sonchus oleraceus*, Common Sowthistle
- *Tamarix chinensis*, Chinese Saltcedar
- *Taraxacum officinale*, Common Dandelion
- *Trianthema portulacastrum*, Desert Horsepurslane
- *Tribulus terrestris*, Puncturevine

What is a noxious weed?

- Legally, a noxious weed is any plant designated by a Federal, State or county government as injurious to public health, agriculture, recreation, wildlife or property (Borman,1999)

- A noxious weed is also commonly defined as a plant that grows out of place and is "competitive, persistent, and pernicious." (James, et al, 1991)

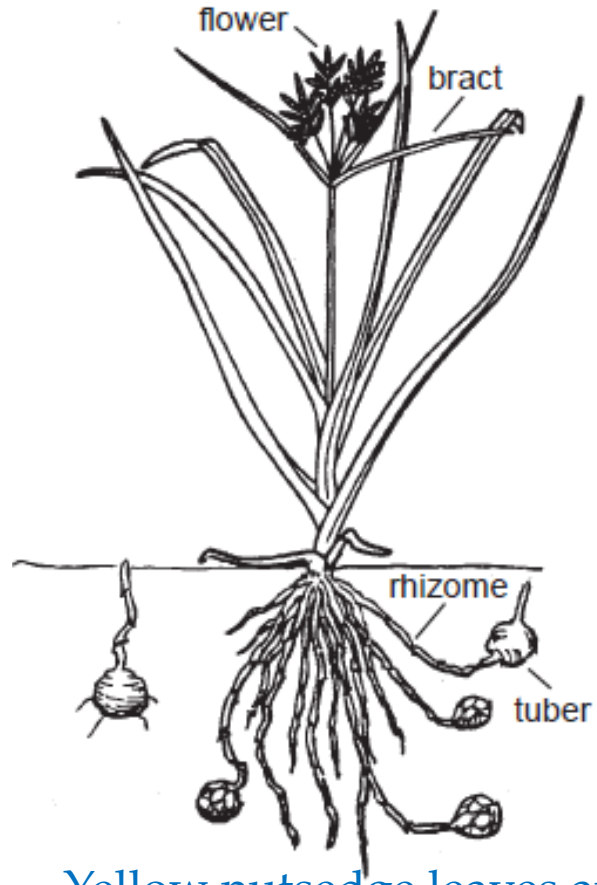
Invasive weeds

- Weeds are considered invasive if they have been introduced into an environment where they did not evolve. As they may not have natural enemies there is no limit to their reproduction & spread (Westbrooks, 1998).

- Some can produce significant changes to vegetation, composition, structure, or ecosystem function (Cronk and Fuller, 1995).

THE NUTSEDGES

- There are two common nutsedges
  - ✓ The purple nutsedge (*Cyperus rotundus*) and
  - ✓ yellow nutsedge (*Cyperus esculentus*)
- mainly found in moist soil in full sun
- Mature yellow nutsedge stem is erect and hairless
- has three long, leaflike bracts at the base of each flower head
- flower mostly during April, May, & June.



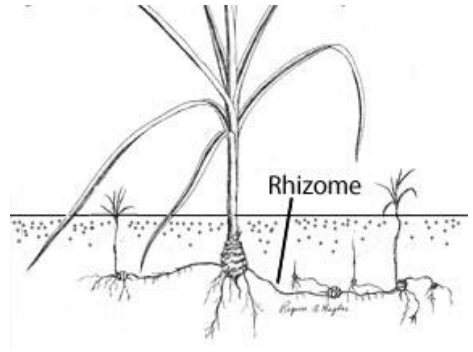
Yellow nutsedge leaves and bracts are arranged in sets of threes

- Nntsedges resemble grasses and often are referred to as “nutgrass,” but they aren’t grasses but are true sedges.

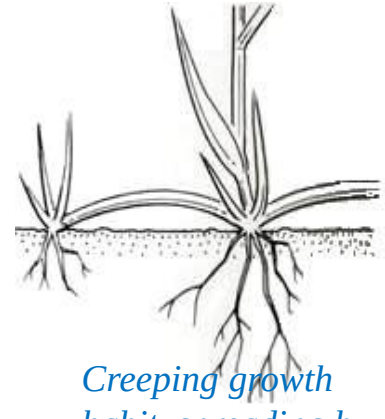
- ✓ Sedge ***stems*** are usually solid and triangular in cross section, which differentiates them from grasses (round)

- ✓ long, thin-textured, narrow, flat ***leaves*** which are usually arranged in threes.

- ✓ Sedges have fibrous root systems & may spread by underground rhizomes and/or aboveground stolons. Many sedges have tubers from which new plants can form.



Creeping growth habit, spreading by underground rhizomes



Creeping growth habit, spreading by aboveground stolons

Root system with tubers

- ✓ Nutsedges are perennial

- In grasses, culms (specialized stem) are cylindrical & covered in solid nodes (swollen joints) & are hollow

- sedges– have no nodes, culms themselves are solid

Grass

Sedge

- sedges typically have showy flowers that are easily distinguishable from many turfgrass & weedy grass species.

Annual blue-eyed grass

Purple nutsedge

Differentiating Nutsedges

- Yellow nutsedge, *Cyperus esculentus*, (top) &

- Purple nutsedge, *C. rotundus*, (Fig. 2).

  - ✓ Yellow nutsedge grows throughout California,
  - ✓ Purple nutsedge grows mostly in southern CA.

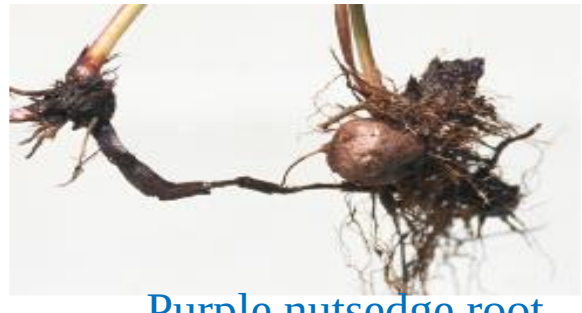
- Yellow nutsedge has light brown flowers & seeds, while purple nutsedge flowers have reddish tinge & seeds are dark brown or black.

Mature yellow nutsedge plant

Mature purple nutsedge flower

- Yellow nutsedge – a single tuber forms at the end of a rhizome, in purple nutsedge tubers grow in chains with several of them on a single rhizome

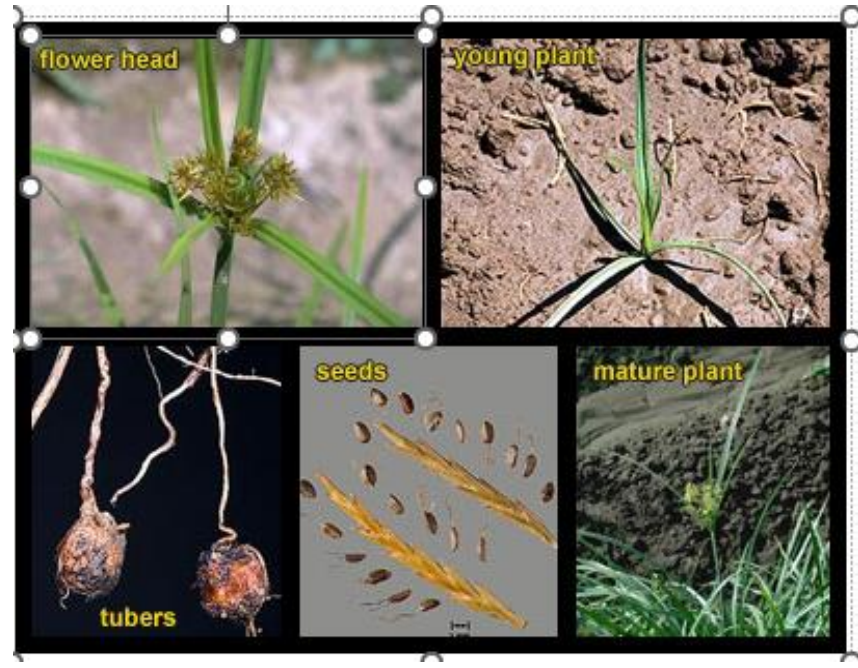
Yellow nutsedge roots, rhizomes, & tubers.



Purple nutsedge root system-tubers linked in chains.

- Nutsedges are among the most noxious weeds of agriculture

- They are difficult to control, often form dense colonies, & can greatly reduce crop yields.



- In CA, nutsedges are particularly problematic in summer-irrigated annual and perennial crops, but yellow nutsedge is much more widespread than the purple nutsedge

- Yellow nutsedge primarily propagates by tubers formed on underground, horizontal creeping stems called rhizomes, mostly in the upper foot of soil

WEED MANAGEMENT

Integrated Pest Management (IPM)?

- Is a process you can use to solve pest problems while minimizing risks to people and the environment.

- IPM can be used to manage all kinds of weeds anywhere–in urban, agricultural, and wildland or natural areas.

- Is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques (biological, habitat manipulation, modification of cultural practices, use of resistant varieties & pesticides

- Pesticides are used only after monitoring indicates they are needed

Controlling Nutsedges

- Sedges are a persistent problem.

- The best approach to avoid nutsedges is to prevent establishment. Once established, nutsedge plants are difficult to control.

  - ✓ Hence, the first step in controlling them is to avoid providing an ideal habitat. Eliminating wet conditions that favor nutsedge growth

  - ✓ Areas that remain wet for extended periods of time are vulnerable to sedges. High foot traffic and soil compaction are other risk factors.

  - ✓ Prevent establishment by removing small plants before they develop tubers, using certain fabric mulches on beds, & making sure nutsedge tubers aren't brought in with topsoil or other materials.

- Excessive irrigation is a common error. Have a better lawn (for example) by using less water.
  - ✓ Improve surface & subsurface drainage may also be necessary

- You can start removing existing sedge after identifying the extent of the problem. In addition to consistently removing small plants, you can reduce nutsedge populations by drying, shading, and using properly timed applications of herbicides.

Cultural Control

- Removing Plants and Tubers. Tubers are key to nutsedge survival. If you can limit production of tubers, you'll eventually control the nutsedge itself.

- Continually removing shoots depletes the energy reserves in the tuber

- The best way to remove small plants is to pull them up by hand or to hand hoe. Using a tiller to destroy mature plants only will spread the infestation, because it will move the tubers around in the soil. However, repeated tillings will reduce populations.

- During summer, cultivate infested areas and then withhold all moisture to allow the sun to dry the tubers.

- Nutsedges don't grow well in shade. Rotating field with tall, dense ground cover or shrub will shade out nutsedge.

Solarization

- “Cooks” soil
- Kills existing weeds & seeds
- Non-selective (kills all soil organisms)
- Best done late spring and early summer

Mulching

- Know that commonly used black polyethylene plastic mulches don't control yellow or purple nutsedge, because the sharp points at the ends of their leaves can penetrate them.

- Landscape fabrics made from polypropylene polymers can effectively suppress nutsedges.

Cover Crops –

- Cover crops reduce erosion and help maintain soil organic matter when the cover is worked into the soil in the spring.

- Mow the cover crop and work it into the soil before it seeds

Summer Cover-Cropping for Weed control

Objective: evaluate impact of summer cover cropping in suppressing weed population & enhancing productivity of subsequent vegetable crop

cropping treatments

1) Cover cropping using marigold (*Tagetes patula*)
2) Cover cropping using cowpea (UCR CC 36)
3) Fallow plot

Bachie & McGiffen, 2013

Plots = marigold (front), cowpea (middle) & Fallow (further)

Cutting & chopp

Broccoli grown on summer cover cropped plots (front) and summer fallow (further)

Table 1: Weed population density per m2 for the early, mid, and harvest time sampling*

Weed species	Weed sampling time and cropping treatments								
	Early			Mid			Harvest		
	mg	cp	fw	mg	cp	fw	mg	cp	fw
2008 (1st year)									
Common purslane	34a	82a	370b	2a	10a	36a	0a	8a	36a
All broadleaves**	65a	105a	409b	29a	26a	57a	23a	21a	64b
All grasses***	22a	5a	24a	5a	6a	26a	2a	2a	21a
All Weeds	87a	110a	433b	33a	32a	82b	25a	23a	85b
2009 (2nd year)									
Common purslane	96a	85a	331b	7a	10ab	40b	6a	9a	63b
All broadleaves	128a	115a	415b	11a	14a	58b	33a	17a	87b
All grasses	9a	15a	23a	3a	2a	5a	6a	2a	7a
All Weeds	137a	130a	437b	14a	16a	62b	39a	19a	94b
2010 (3rd year)									
Common purslane	32a	16a	197b	5a	3a	11b	0.3	0.5	0.0
All broadleaves	64a	24a	281b	26ab	14a	44b	13ab	3a	15b
All grasses	1a	0a	7a	2a	0a	2a	0.3a	0a	1a
All Weeds	65a	24a	288b	28ab	14a	46b	13ab	3a	16b

* Horizontal mean values for each weed species within each sampling time followed by different letters are significantly different from each other (mg = marigold, cp = cowpea and fw = fallow.

** Broadleaf weeds (Common lambsquarter, Black nightshade, Amaranth, Redstem filare, Sowthistle, Field bindweed, Shepherd's purse). Amaranth species were *A. albus*, *A. sinosus* and *A. retroflexus*.

*** Grass weeds = Barnyardgrass, Mediteranean lovegrass

Bachie & McGiffen, 2013

Summary

- Cover cropping reduces weed population density in subsequent vegetable crops

- CC compared to the fallow system increased;
  - ✓ soil organic matter
  - ✓ crop growth & yield

- OM and crop yield increased with increasing years of cover cropping rotations, indicating build up effects from repeated cover cropping.

Chemical Control

- Few herbicides are effective at controlling nutsedge, either because of a lack of selectivity to other plants or a lack of uptake.

- If suitable herbicides, apply when they'll be most effective Note that most herbicides aren't effective against mature plants / tubers.

Controlling Nutsedge with Chemicals.
(None of these products effectively controls mature plants.)

Herbicide	Commercial name	Apply before plants emerge	Apply to young plant	Available to home gardener
dichlobenil	Casoron	yes	no	yes
dimethenamid-P	Freehand	yes	no	no
glyphosate	Roundup	no	yes	yes
halosulfuron	Sedgehammer	no	yes	yes
metolachlor	Pennant	yes	no	no
penoxsulam	Green Light Wipe Out Tough Weed Killer for Lawns	no	yes	yes
sulfosulfuron	Certainty	no	yes	no
trifloxysulfuron-sodium	Monument	no	yes	no

Nonselective Postemergent Herbicides

- The only nonselective postemergent herbicide currently available to control nutsedge is glyphosate (e.g. Roundup) or glyphosate with nonaoic acid (Roundup Plus).
- Would not kill mature plants and tubers
- Do not follow up with immediate irrigation

Selective Postemergent Herbicides

- Postemergent that have some selectivity, particularly in turf, are halosulfuron (Sedgehammer) and MSMA.
- MSMA is more effective on yellow than on purple nutsedge.
- These herbicides move through the plant rapidly, but must be applied before the fifth-leaf stage, otherwise translocation to tubers slows down or ceases, & the herbicide will kill only the aboveground portion
- Follow all label directions for optimal control
- Other herbicides available to professionals for use on turf include trifloxysulfuron-sodium (Monument) and sulfosulfuron (Certainty).

Preemergent Herbicides

- No effective pre-emergent control for purple nutsedge, but *dichlobenil* (Casoron), *metolachlor* (Pennant), and d*imethenamid-P* can suppress emergence of yellow nutsedge in ornamental, but not turf grass

- In lawns you may apply **Ortho® Nutsedge Killer Ready-To-Spray**.
  - ✓ It's effective against newly emerged & established sedges.

Does pulling nutsedge make it worse?

- Pulling increases number of plants because dormant tubers are activated.
- However, persistent pulling **will eventually weaken the plants & kill it**.

Why does nutsedges keep returning?

- from **overwatering with sprinkler system, rain, or a combination of both**.

- The best way to minimize nutsedge is to grow and maintain dense and healthy turf or crop & outcompete nutsedge for space, food, & moisture

Does natural products, such as vinegar kill nutsedges?

- **Yes! Vinegar** can kill nutsedges in lawns & garden. It can also control other weeds

Thank you !