

DESERT DEFENDERS TRAINING WORKBOOK

Non-Native Invasive Plant Species of Central and Southern Arizona















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Training Workbook: Non-Native Plant Species



Photo credit: Michael J Plagens

PLANT: BUFFELGRASS

BOTANICAL NAME: Pennisetum ciliare

OTHER COMMON NAMES: zacate buffel; pasto buffel

FAMILY: Poaceae - Grass Family

NATIVE REGION: Widespread in Africa, the Middle East, Indonesia, and tropical Asia; introduced as livestock forage in the 1930s.

HABITAT: Found to 3000', widespread in disturbed habitats, along roads and trails, and in washes

BLOOMS: July to October

- Perennial shrubby bunchgrass up to 3-5ft. tall and 3ft.
 wide
- Flower heads are brush-like, plump with brown to purplish color when fresh, turning straw-colored
- Profuse branching in older plants gives them a messy, tangled appearance
- Spreads aggressively and patches double in size every 2-3 years forming dense monotypic stands of thickly matted plants
- Increases fuel load and fire risk; re-emerges readily after a burn
- The USFWS named *P. ciliare* a foremost threat to the Desert Tortoise populations due to changes in forage, temperature, and fire frequency



Photo credit: Jessi Szopinski



Photo credit: Arizona-Sonora Desert Museum



Photo credit: @snakeinmypocket (iNat)

Buffelgass - Pennisetum ciliare, Cenchrus ciliaris

LIFE STAGES/PHENOLOGY:

Seedling/Young

Flowering

Seeding/Mature











Photo credit: Willie Sommers

Photo credit: Carlos Domínguez-Rodríguez Photo credit: Amy Jaecker-Jones

Photo credit: Emir Ivan Gonzalez

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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Photo credit: Steve Jones

PLANT: FOUNTAIN GRASS

BOTANICAL NAME: Cenchrus setaceus

OTHER COMMON NAMES: Crimson fountain grass, Green fountain grass, Purple fountain grass

FAMILY: Poaceae - Grass Family

NATIVE REGION: Native to open, scrubby habitats in East and tropical Africa, Middle East and SW Asia. Seeds first available in the US in 1880s, and as ornamental in 1940s

HABITAT: Found mainly in washes, riparian areas, in grasslands, on disturbed roadsides, on rocky outcrops, and in canyons, from 2000' to 3500' in elevation

BLOOMS: May to October

- Tufted perennial bunch grass grows up to 5 ft. tall.
- Flower heads are showy pink to purplish, wide with a brush-like appearance
- Long, narrow, green leaf-blades, have hairy edges, and arise from the base of the plant
- Prolific seed producer and spreads rapidly from cultivation into nearby disturbed & undisturbed areas
- Although some nursery varieties are considered "sterile", especially the red variety, none are recommended for landscaping
- Forms dense stands, outcompeting native plants and is highly flammable, increasing wildfire risk



Photo credit: @mksdsu (iNaturalist)



Photo credit: Sue Carnahan



Photo credit: @bburke (iNaturalist)

Fountain Grass - Pennisetum setaceum, Cenchrus setaceus

LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: @malena_galatioto (iNat)

Flowering



Photo credit: Colin Barrows



Photo credit: Yakuso Hirata

Seeding/Mature



Photo credit: @hikingsandiego (iNat)

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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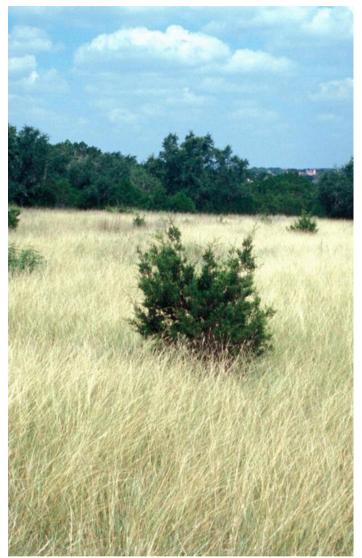


Photo credit: John M. Randall

PLANT: YELLOW BLUESTEM

BOTANICAL NAME: Bothriochloa ischaemum

OTHER COMMON NAMES: Turkestan beard grass; King Ranch bluestem

FAMILY: Poaceae - Grass Family

NATIVE REGION: Native to Southern Europe, northern Africa, and Asia; introduced for forage and erosion control

HABITAT: Found in disturbed areas, roadsides, and grasslands. Elevation range was up to 4,000' but has recently been spotted growing in Northern AZ.

BLOOMS: Late June through July

- Perennial grass that grows up to 4ft. tall
- Flower heads are a silvery, reddish purple. Seed heads are shaped like a "turkey foot"
- Leaves are flat or folded, usually smooth and a yellowgreen color. Scattered hair, parallel veins.
- Spreads aggressively with extremely dense roots
- Increases fuel load and fire risk; re-emerges readily after a burn
- This species forms huge monocultures, it is not favored by animals for forage, and it sheds chemicals that make the soil inhospitable for native plants



Photo credit: Bethany DeRango



Photo credit:: Max Licher



Photo credit: Julie Leutzelschwab

Yellow Bluestem - Bothriochloa ischaemum

LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Jessi Szopinski

Flowering



Photo credit: Dr. Amadej Tmcoky

Seeding/Mature



Photo credit: Max Licher



Photo credit: Max Licher

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?

NOTES:



Yellow Bluestem has hairy ligules — the ligule is the spot where the leaf blade diverges from the stem; delicate hairs are obvious when the leaf blade is pulled away from the stem.

Photo credit: Steve Matson



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Photo credit: @hthroop(iNaturalist)

PLANT: RED BROME

BOTANICAL NAME: Bromus rubens

OTHER COMMON NAMES: Foxtail chess, Foxtail brome

FAMILY: Poaceae, Bromeae tribe

NATIVE REGION: Mediterranean region

HABITAT: Red brome prefers open spaces within shrub and grassland communities.

BLOOMS: March to June

- Cool season, tufted, annual bunchgrass; 8 to 20 inches tall
- Each plant has several stems growing from an erect or slightly spreading base; the stems have narrow, short, flat, hairy, prominently-veined blades and a hairy sheath
- Roots are very shallow; it grows slowly in the winter and more rapidly as soils warm in spring
- Panicles (2 to 3 inches long) are dense, compact, and brush-like with 7 to 11 upright florets
- Reproduction is solely by seed; germination is highest during the fall months
- Mature seed remains mostly dormant through the hot, dry summer
- Added to the Arizona Noxious Weed List in 2024.



Photo credit: Willie Sommers



Photo credit::Don Pike



Photo credit:Don Pike

Red Brome - Bromus rubens

LIFE STAGES/PHENOLOGY:

Seedling/Young



Seeding/Mature









SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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Photo credit: Max Licher

PLANT: GIANT REED

BOTANICAL NAME: Arundo donax

OTHER COMMON NAMES: Arundo grass, reed grass, giant cane, Spanish reed

FAMILY: Poaceae

NATIVE REGION: Eastern Asia

HABITAT: Grows along river banks and streams as well as culverts, ditches, and roadsides where water accumulates. Grows from elevations to 1,600 to 8,000 ft.

BLOOMS: Flowers in late summer but rarely reproduces viable seed in North America

- Introduced for erosion control along water banks in the early 1800s
- Perennial grass with thick and fibrous stems that can grow very tall, ranging from 6-30 feet
- Leaf blades are evenly spaced along the stem and are elongated and flat, can grow over 12 inches and 1-3 inches wide
- Vegetative reproduction through rhizome sprouts and stem nodes
- Inflorescences- or flowers- are very dense and plumelike reaching up to 2 ft long with a tan or white color
- Grows very rapidly- under optimal conditions 1.5-4 inches per day- forming large patches along waterways



Photo credit: Max Licher



Photo credit:: Anthony Mendoza



Photo credit: James H. Miller

Giant Reed - Arundo donax

LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Zachery Berry

Seeding/Mature





Photo credit: Max LIcher

SKETCH IT OUT:

Photo credit: Willie Sommers

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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Photo credit: Mahomed Dursai

PLANT: AFRICAN SUMAC

BOTANICAL NAME: Searsia lancea, Rhus lancea

OTHER COMMON NAMES: Willow rhus, Karee

FAMILY: Anacardiaceae

NATIVE REGION: South Africa

HABITAT: Introduced as a shade tree and ornamental in Phoenix and Tucson. Has escaped cultivation and become established in desert riparian areas.

BLOOMS: Winter

- Evergreen, multi-trunked tree that reaches heights of 15-30 feet
- Tree is not deciduous but can lose many leaves during the summer months due to heat stress
- Dark gray trunk with fissures that can be a orange underneath
- Leaves form in groups of three and are slender and lance shaped reaching 2-3 inches long
- Leaves are dark green and shiny on top and pale green beneath
- Whitish-green flowers with reddish twigs
- Yellow or red berry-like fruit that grows in clusters
- Drought tolerant with extensive root system
- Added to the Arizona Noxious Weed List in 2024



Photo credit: Gigi Laidler



Photo credit: Andrew Meeds



Photo credit: Robert Perry

African Sumac - Searsia lancea, Rhus lancea

LIFE STAGES/PHENOLOGY:

Seedling/Young









Photo credit: Dr. Michael Pfeiffer

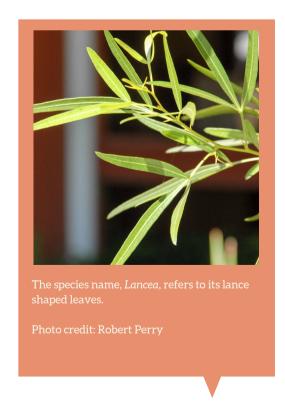
Photo credit: Eric Hough

Photo credit: Tim Steller

Photo credit: Robert Perry

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





Training Workbook: Non-Native Plant Species



Photo credit: dustycoffee

PLANT: SALT CEDAR

BOTANICAL NAME: Tamarix ramosissima, Tamarix chinensis

OTHER COMMON NAMES: Tamarisk

FAMILY: Tamaricaceae - Tamarisk family

NATIVE REGION: Eurasia

HABITAT: Found along watercourses and riparian areas widely below 5,000 ft. Brought to the US in the 1820s as an ornamental, later used for windbreaks.

BLOOMS: April to August

- Grows quickly and can create large, dense stands that displace native vegetation like cottonwoods, willows and mesquite.
- These large shrubs or trees can grow 10-15 ft, but have been known to reach 50 ft.
- Flowers are spikes, pink or white, feathery with many smooth reddish brown branches.
- Changes stream bed hydrology, lowers water tables and increases soil salinity.
- The USDA introduced Tamarisk leaf beetles (Diorhabda spp.) in 2007 as a biocontrol for Tamarix populations in the West.



Photo credit: Juanita Armstrong



Photo credit: Ramazan Murtazaliev



Photo credit: Karen Antashyan

Tamarisk - Tamarix ramosissima

LIFE STAGES/PHENOLOGY:



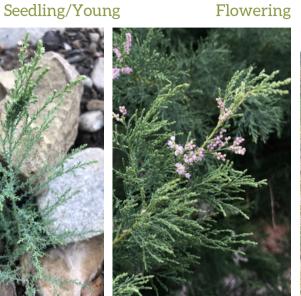






Photo credit: lurkeneff

Photo credit: catchang

Photo credit: Juanita Armstrong

Photo: Liliana Ortiz Serrato

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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Photo credit: William Terry Hunefeld

PLANT: SAHARA MUSTARD

BOTANICAL NAME: Brassica tournefortii

OTHER COMMON NAMES: Asian Mustard, African Mustard

FAMILY: Brassicaceae - Mustard Family

NATIVE REGION: North Africa and the Middle East

HABITAT: Found in sandy soil, dry washes, and along trail edges. It occupies a variety of disturbed habitats from roadsides, washes, open fields, grasslands, coastal sage scrub and the upland desert.

BLOOMS: December to March

- Winter annual, in early growth it forms a large basal rosette, its leaves are 3-12 inches and are lobed and toothed.
- Stem and leaves are covered with simple hairs.
- Flower heads can vary in size and consist of 6-20 small dull yellow "butterfly" shaped flowers.
- Fruit are specialized structures called siliques that burst open when mature!
- They can contain 14-30 seeds in each pod.
- This plant spreads by seeding itself across the desert landscape.



Photo credit: Patricia Simpson



Photo credit: Carianne Campbell



hoto credit: Juanita Armstrong

Sahara Mustard - Brassica tournefortii

LIFE STAGES/PHENOLOGY:

Seedling/Young



Flowering







Photo credit: Neil Frakes

Photo credit: Yael Orgad

Photo credit: Don Rideout

Photo credit: Marianne Skov Jensen

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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Photo credit: Mohammad Marafi

PLANT: LONDON ROCKET

BOTANICAL NAME: Sisymbrium irio
OTHER COMMON NAMES: Desert Mustard, Rocket
Mustard, or Tumble Mustard

FAMILY: Brassicaceae - Mustard Family

NATIVE REGION: Southern Europe, North Africa and temperate Asia

HABITAT: Found in growing in irrigated areas, open fields, disturbed areas and desert landscapes. Occurs in elevations below 4,500 ft.

BLOOMS: December to March

- Winter annual/biennial with erect stems, branched at the base, that grows to about 20 inches tall.
- Lower leaves grow to 6 inches long, upper leaves are usually smaller, narrow in shape, with smooth edges and one or more pairs of elongated lobes at the base.
- Bright or pale yellow flowers, 0.2-0.3 inches in diameter become slender green to brown seed pods that ascend up the flowering stems.
- Like Sahara Mustard these seed pods also burst open releasing about 80 seeds per pod!
- This plant spreads by seeding itself across the desert landscape.



Photo credit: Matthew Salkiewicz



Photo credit: Joshua Emms



Photo credit: Tom Chester

London Rocket - Sisymbrio irio

LIFE STAGES/PHENOLOGY:

Seedling/Young



Seeding/Mature









Photo credit: Mohammad Marafi

Photo credit: Chandler Sonafrank

Photo credit: Chuck Sexton

Photo credit: Chuck Sexton

SKETCH IT OUT:

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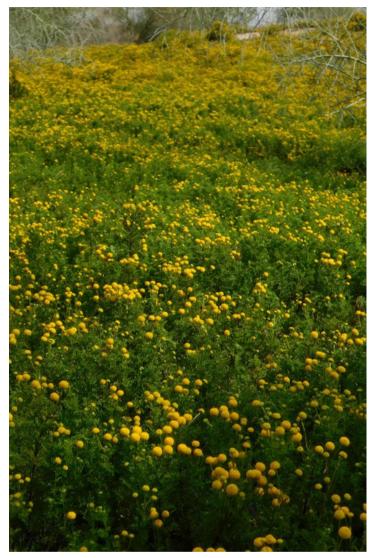


Photo credit: Juanita Armstrong

PLANT: STINKNET

BOTANICAL NAME: Oncosiphon pilulifer

FAMILY: Asteraceae - Sunflower Family

NATIVE REGION: Native to Eurasia

HABITAT: Found on roadsides and in disturbed areas, river bottoms, agricultural areas, riparian areas, and washes in clay, sandy and gravelly soils typically 1500' to 3000'

BLOOMS: February to May

- Annual herb with numerous small flower heads appearing like bright yellow or gold spheres
- Erect stems; sparsely covered with stiff, slender bristles
- Stems and leaves are strongly scented
- Has been reported to cause skin or allergic reactions use caution when handling the plant!
- Rapidly spreading across central Arizona and SW California (San Diego, Orange Counties)
- The species was added to the Arizona Noxious Weed List in 2020



Photo credit: Juanita Armstrong



Photo credit: Maricopa County Parks and Rec



Photo credit: missy roo22

Stinknet - Oncosiphon pilulifer

LIFE STAGES/PHENOLOGY:



SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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Photo credit: Max Licher

PLANT: COMMON SOW THISTLE

BOTANICAL NAME: Sonchus oleraceus

OTHER COMMON NAMES: Common Cow Thistle, Chinita, Achicoria Dulce, Muela de Caballo

FAMILY: Asteraceae - Sunflower Family

NATIVE REGION: Europe

HABITAT: Found readily along trails, fields, roadsides, and other disturbed areas, and occurs between 500 and 4,500 feet in elevation.

BLOOMS: March to September

- Has large basal leaves, branching leaves extend upward from 1 – 5 feet, these leaves have spiny lobed edges. The leaf lobes can be distinguished by the base, which will nearly encircle the stem.
- Milky sap can be found within all parts of the plant.
 Forms a deep taproot.
- Weathers through the heat fairly well; can complete life cycle before it's too dry or hot.
- Inflorescences (flower heads) are 0.5-1 inch, yellow, with similarity to a dandelion.
- Seeds are wind dispersed, with 80-250 seeds per flower head.



Photo credit: Kristin Johnson



Photo credit: Leonard Dewaele



Photo credit: Drepanostoma

Common Sow Thistle - Sonchus oleraceus

LIFE STAGES/PHENOLOGY:

Seedling/Young



Seeding/Mature









Photo credit: ming110

Photo credit: Ron Frumkin

Photo credit: Fabio Cianferoni

Photo: Fred Melgert/Carla Hoegen

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





Training Workbook: Non-Native Plant Species



Photo credit: firebugzy

PLANT: MALTA STARTHISTLE

BOTANICAL NAME: Centaurea melitensis

OTHER COMMON NAMES: Napa starthistle, tocalote

FAMILY: Asteraceae - Sunflower Family

NATIVE REGION: Europe

HABITAT: Found in disturbed, open sites such as grasslands, roadsides, and fields. Can also be seen by trail sides. It ranges to 7,200 feet in elevation.

BLOOMS: April to July

- Winter annual, in early growth in a basal rosette, then bolts in spring to 2 ft high.
- Leaves are lobed at the base and have prickly hairs, and winged stems.
- Inflorescences (flower heads) are a 0.5 inch or less, yellow with sharp spines.
- There are up to 100 flowers per plant and 60 seeds per flower head.
- Can form dense stands, outcompeting other plant species.
- Listed as a noxious weed in Arizona.



Photo credit: Fred Melgert/Carla Hoegen



Photo credit: robertanau



Photo credit: marathonvet

Malta Starthistle - Centaurea melitensis

LIFE STAGES/PHENOLOGY:

Seedling/Young

Flowering

Seeding/Mature











Photo credit: Stephanie Calloway

Photo credit: Raxhana Mendez

Photo credit: cheonggaegori

Photo: Cedric Lee

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?





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Photo credit: Sue Carnahan

PLANT: RUSSIAN THISTLE

BOTANICAL NAME: Kali tragus, Salsola tragus

OTHER COMMON NAMES: Tumbleweed, Tumbling thistle

FAMILY: Amaranthaceae

NATIVE REGION: Eurasia

HABITAT: Semi-arid disturbed ecosystems

BLOOMS: Late fall-winter

- Warm season, annual forb
- Grows erect and rounded, up to 3 feet tall and 6 feet in diameter
- Stems grow opposite each other and are very branched with red to purple striations
- Leaves are alternate and long, thick, and end in a sharp spine, can be semi-succulent to succulent
- Leaves are soft when immature but harden into stiff spines with maturity
- Inflorescence is a solitary flower or a cluster of 2-3 flowers with sharp bracts
- Deep taproot that can grow over 6 feet deep
- Seed production is prolific with large plants producing up to 250,000 seeds
- Wind tumbling seed dispersal mechanism contributes to its fast growing and wide reaching populations



Photo credit: Kirsten Phillips



Photo credit: Paul Rothrock



Photo credit: Max Licher

Russian Thistle - Kali tragus, Salsola tragus

LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Anthony Mendoza

Flowering



Photo credit: Liz Makings

Seeding/Mature





Photo credit: C. Bernau

SKETCH IT OUT:

Is there a physical characteristic sticking out? What might help you recognize this plant in nature?



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Buffelgrass

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Fountain Grass

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Yellow Bluestem

https://nazinvasiveplants.org/yellow-bluestem-grass

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Red Brome

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Sahara Mustard

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Russian Thistle

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