



# DESERT DEFENDERS TRAINING WORKBOOK

Non-Native Invasive Plant Species





# DESERT DEFENDERS

Training Workbook: Non-Native Plant Species



Photo credit: Michael J Plagens

## PLANT: **BUFFELGRASS**

**BOTANICAL NAME:** *Pennisetum ciliare*, *Cenchrus ciliaris*

**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

### **DESCRIPTION:**

- 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: Casey Kuhn



Photo credit: Arizona-Sonora Desert Museum



Photo credit: Emir Ivan Gonzalez



# DESERT DEFENDERS

Buffelgrass - *Pennisetum ciliare*, *Cenchrus ciliaris*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Neil Frakes

Flowering



Photo credit: Rob Klotz

Seeding/Mature



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?

## NOTES:



Buffelgrass 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 slightly away from the stem.

Photo credit: Arizona-Sonora Desert Museum





# DESERT DEFENDERS

Training Workbook: Non-Native Plant Species



Photo credit: Steve Jones

## PLANT: FOUNTAIN GRASS

**BOTANICAL NAME:** *Pennisetum setaceum*, *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

### DESCRIPTION:

- 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: Juanita Armstrong



Photo credit: Sue Carnahan



Photo credit: Juanita Armstrong



# DESERT DEFENDERS

Fountain Grass - *Pennisetum setaceum*, *Cenchrus setaceus*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Neil Frakes

Flowering



Photo credit: Yael Orgad

Seeding/Mature



Photo credit: Don Rideout



Photo credit: Juanita Armstrong

## SKETCH IT OUT:

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

## NOTES:



The Arizona nursery trade allows the sale of "red fountain grass" which does not go rogue in the wild (up to now) - "*Pennisetum rubrum*".

Photo credit: John Scheuring





# DESERT DEFENDERS

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

### **DESCRIPTION:**

- 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 know 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 began introducing Tamarix beetles (*Diorhabda* spp.) in 2007 in an attempt to reduce Tamarix populations in the West.



Photo credit: Juanita Armstrong



Photo credit: Ramazan Murtazaliev



Photo credit: Karen Antashyan



# DESERT DEFENDERS

Tamarisk - *Tamarix ramosissima*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: lurkeneff

Flowering



Photo credit: catchang

Seeding/Mature



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?

## NOTES:



Tamarisk is used in traditional Chinese medicine for a variety of uses such as stomach flu and skin conditions.

Photo credit: Fred Melgert / Carla Hoegen





# DESERT DEFENDERS

Training Workbook: Non-Native Plant Species



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

### **DESCRIPTION:**

- 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



Photo credit: Juanita Armstrong



# DESERT DEFENDERS

Sahara Mustard - *Brassica tournefortii*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Neil Frakes

Flowering



Photo credit: Yael Orgad

Seeding/Mature



Photo credit: Don Rideout

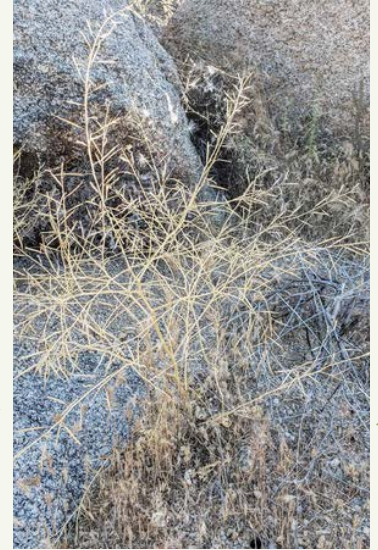


Photo credit: Marianne Skov Jensen

## SKETCH IT OUT:

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

## NOTES:



New plants can be seen following the fall-winter rains and can be tricky to tell apart from native mustards when young.

Photo credit: wolfhoundgirl





# DESERT DEFENDERS

Training Workbook: Non-Native Plant Species



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

### **DESCRIPTION:**

- 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



# DESERT DEFENDERS

London Rocket - *Sisymbrium irio*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Mohammad Marafi

Flowering



Photo credit: Chandler Sonafrank

Seeding/Mature



Photo credit: Chuck Sexton



Photo credit: Chuck Sexton

## SKETCH IT OUT:

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

## NOTES:



Here's a tip! London rocket has smooth and almost hairless leaves.

Photo credit: roomthily





# DESERT DEFENDERS

Training Workbook: Non-Native Plant Species



Photo credit: Juanita Armstrong

## PLANT: STINKNET

**BOTANICAL NAME:** *Oncosiphon pilulifer*

**OTHER COMMON NAMES:** Globe Chamomile

**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

### **DESCRIPTION:**

- Annual herb with numerous small flower heads appearing like bright yellow or gold half-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 as an invasive or noxious species by Arizona in 2020



Photo credit: Juanita Armstrong



Photo credit: Maricopa County Parks and Rec

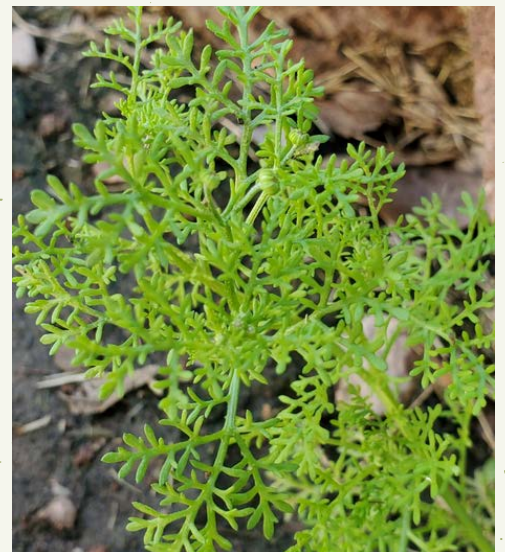


Photo credit: missy\_roo22



# DESERT DEFENDERS

Stinknet - *Oncosiphon pilulifer*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Steve Jones

Flowering



Photo credit: hebeamerling

Seeding/Mature



Photo credit: debbiesak

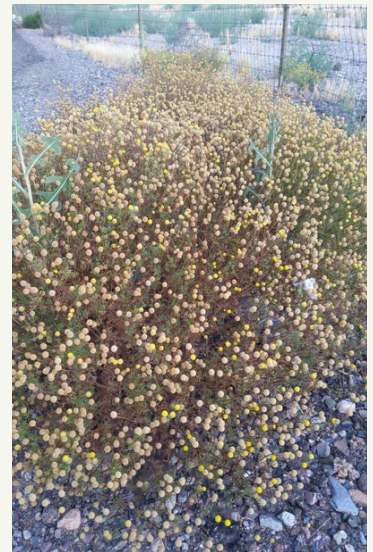


Photo credit: Andy Bridges

## SKETCH IT OUT:

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

## NOTES:



This plant is quite pungent and has a very strong odor. Some like it, some don't but be careful when pulling it from your yards!

Photo credit: Dr. Michael Pfeiffer





# DESERT DEFENDERS

Training Workbook: Non-Native Plant Species



Photo credit: kastani

## PLANT: COMMON SOW THISTLE

**BOTANICAL NAME:** *Sonchus oleraceus*

**OTHER COMMON NAMES:** Sowthistle, Common Cow Thistle, Laiteron, Pualelé Spanish: 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

### **DESCRIPTION:**

- 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



# DESERT DEFENDERS

Common Sow Thistle - *Sonchus oleraceus*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: ming110

Flowering



Photo credit: Ron Frumkin

Seeding/Mature



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?

## NOTES:



An identification clue: the leaves of the Common Sow Thistle are quite spiky.

Photo credit: Kristin Johnson





# DESERT DEFENDERS

Training Workbook: Non-Native Plant Species



Photo credit: firebugzy

## PLANT: MALTA STAR-THISTLE

**BOTANICAL NAME:** *Centaurea melitensis*

**OTHER COMMON NAMES:** Napa star-thistle, 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

### **DESCRIPTION:**

- 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



# DESERT DEFENDERS

Malta Star-Thistle - *Centaurea melitensis*

## LIFE STAGES/PHENOLOGY:

Seedling/Young



Photo credit: Stephanie Calloway

Flowering



Photo credit: Raxhana Mendez

Seeding/Mature



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?

## NOTES:



The Malta Star-Thistle has soft, cottony leaves and can grow up to 3 feet in wet years!

Photo credit: Josie Lesage





# DESERT DEFENDERS

## Training Workbook: Non-Native Plant Species

### SOURCES:

#### **Buffelgrass**

<https://www.nps.gov/sagu/learn/nature/buffelgrass.htm>  
<https://www.desertmuseum.org/buffelgrass/>  
[https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd563017.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd563017.pdf)  
<http://swbiodiversity.org/seinet/taxa/index.php?taxon=Pennisetum+ciliare>

#### **Fountain Grass**

<https://www.nps.gov/sagu/learn/nature/fountain-grass.htm>  
<http://swbiodiversity.org/seinet/taxa/index.php?taxon=Pennisetum+setaceum>  
[https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5410113.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410113.pdf)  
<http://www.public.asu.edu/~camartin/plants/Plant%20html%20files/pennisetumsetaceum.html>

#### **Salt Cedar**

<https://www.nps.gov/sagu/learn/nature/tamarisk.htm>  
<https://www.nazinvvasiveplants.org/tamarisk>  
<http://swbiodiversity.org/seinet/taxa/index.php?taxon=Tamarix+chinensis>

#### **Sahara Mustard**

[https://wric.ucdavis.edu/information/natural%20areas/wr\\_B/Brassica\\_tournefortii.pdf](https://wric.ucdavis.edu/information/natural%20areas/wr_B/Brassica_tournefortii.pdf)  
[https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/fseprd563044.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd563044.pdf)  
[https://www.maricopacountyparks.net/assets/1/6/Desert\\_Invaders-Online.pdf](https://www.maricopacountyparks.net/assets/1/6/Desert_Invaders-Online.pdf)

#### **London Rocket**

[http://southwestdesertflora.com/WebsiteFolders/All\\_Species/Brassicaceae/Sisymbrium%20irio,%20London%20Rocket.html](http://southwestdesertflora.com/WebsiteFolders/All_Species/Brassicaceae/Sisymbrium%20irio,%20London%20Rocket.html)  
<https://aces.nmsu.edu/ces/plantclinic/documents/london-rocket-w-11.pdf>  
[http://www.herbiguide.com.au/Descriptions/hg\\_London\\_Rocket.htm](http://www.herbiguide.com.au/Descriptions/hg_London_Rocket.htm)

#### **Stinknet**

[http://southwestdesertflora.com/WebsiteFolders/All\\_Species/Asteraceae/Oncosiphon%20piluliferum,%20Stinknet.html](http://southwestdesertflora.com/WebsiteFolders/All_Species/Asteraceae/Oncosiphon%20piluliferum,%20Stinknet.html)  
<http://swbiodiversity.org/seinet/taxa/index.php?taxon=Oncosiphon+piluliferum>  
<http://www.sdcwma.org/species/stinknet.php>

#### **Common Sow Thistle**

[http://southwestdesertflora.com/WebsiteFolders/All\\_Species/Asteraceae/Sonchus\\_oleraceus.html](http://southwestdesertflora.com/WebsiteFolders/All_Species/Asteraceae/Sonchus_oleraceus.html)  
<https://www.cabi.org/isc/datasheet/50584#tosummaryOfInvasiveness>  
<http://www.arizonensis.org/sonoran/fieldguide/plantae/sonchus.html>

#### **Malta Star-Thistle**

<http://www.bloomingacademyvillage.org/malta-starthistle/>  
[http://southwestdesertflora.com/WebsiteFolders/All\\_Species/Asteraceae/Centaurea\\_melitensis.html](http://southwestdesertflora.com/WebsiteFolders/All_Species/Asteraceae/Centaurea_melitensis.html)  
[https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5410119.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5410119.pdf)  
<http://www.sdcwma.org/species/maltastarthistle.php>