

# PROPAGATION PROTOCOL AND GENERAL INFORMATION FOR NATIVE AND DESERT-ADAPTED TREES IN THE SONORAN DESERT

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Catclaw acacia (*Senegalia greggii*) Seed Pods

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Tucson Clean and Beautiful

In partial fulfillment of The University of Arizona Plant Sciences internship requirements.  
Supervised by Professor Tanya M. Quist.



# ABOUT

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**Planting the future, growing communities.**

## About Tucson Clean & Beautiful

Tucson Clean & Beautiful (TCB) is a non-profit environmental advocacy and action organization founded in 1985 to preserve and improve our environment, conserve natural resources, and enhance quality of life in the City of Tucson and eastern Pima County. These goals are achieved through educational and hands-on programs emphasizing personal action in recycling and waste reduction, land stewardship, urban forestry and beautification. Originally established to keep our community litter-free, TCB has grown to coordinate programs and projects with a diversity of partners including government agencies, community groups, businesses, and the support of thousands of volunteers. Programs are supported by grants, businesses, personal donations, and in-kind donations of materials and services.



## About Trees for Tucson

Trees for Tucson (TFT) is an urban forestry program from Tucson Clean & Beautiful. Trees for Tucson provides low-cost native and desert-adapted trees to shade and beautify neighborhoods, schools, homes and businesses. TFT also plants trees with community groups and provides tree planting and tree care workshops.



## About the Author

At the time of production, Cassandra Beimfohr was a full-time student attending the University of Arizona pursuing a Bachelors of Science degree in Sustainable Plant Systems with an Urban Horticulture emphasis. This course of study and the practical experience with Trees for Tucson affirm her passion for native plants and trees, and highlight her particular interest in Sonoran pollinators.





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Please note the species listed in this booklet  
have been updated to the most current latin species name.  
Previous latin names are in parentheses for reference.

# INTRODUCTION

This booklet serves as a general resource guide for anyone who is interested in learning more about propagating native and desert-adapted trees in the Sonoran Desert. Each tree species featured will include a general description, botanical information, and best practices for propagating individual tree species.

Native trees are those which occur naturally in a region and have co-evolved with the surrounding ecosystem. Other desert-adapted trees, while not native to the region, are very well-adapted to desert environments with low rainfall, alkaline soils, high temperatures, and low humidity.

Information collected in this booklet was compiled through the shared work of the staff at Trees for Tucson, and the faculty in Plant Science at the University of Arizona. Additionally, the University of Arizona Campus Arboretum served as a valuable resource for collecting photographs of living specimens and detailed information relating to the tree species in this booklet.



Desert ironwood tree flowers



Desert willow tree seedlings



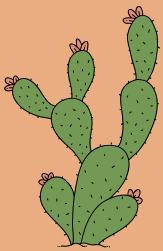
White thorn acacia tree seeds

# BENEFITS OF PLANTING NATIVE AND DESERT-ADAPTED TREES

There are many benefits of planting native and desert-adapted trees in the Sonoran Desert!

## Environmental

Supports native biodiversity in the Sonoran Desert



Reduces soil erosion and mitigates runoff

Acts as a carbon sink



Provides food and other vital resources for native wildlife

## Urban

Conserves water resources in a desert climate



Cools urban environments

Reduces energy bills



Increases property value and visual aesthetics

## Health

Supports mental health & well-being



Removes pollutants from the air

Reduces stress and could help lower blood pressure

Fun fact:

Many parts of our native, Sonoran desert plants are edible. Mesquite seed pods can be used for baking flour, and desert hackberries can be a sweet treat!



# PROPAGATION PRACTICES AND TECHNIQUES

This booklet mentions various strategies for collecting and preparing seeds for propagation. Please refer to the following notes and techniques that are used for growing the desert tree species discussed in this booklet.

## Collecting seeds for planting

**Only harvest 25% of seeds from a tree.**



Limit the amount of seeds you collect to only 25% of the total amount of seeds on a tree. This preserves seeds for future tree generations, animals, and other ecological resources.



**Look for dry, healthy seed pods.**

Select seed pods that are brown and dry. Some seed pods will rattle when shaken. Avoid seed pods that are effected by insects or have visual signs of disease. Do not harvest while seed pods are still green and soft.

**Let seeds dry completely before storing.**



Proper care and attention must be taken when processing and saving seeds. Be sure to let seeds completely dry before storing. This prevents seeds from growing mold or rotting.

## Preparing seeds for planting

**Some seeds may need to be scarified before planting.**



Nail clippers



Metal file



Scarifying seeds helps speed up the process of germination. At Trees For Tucson, we prefer to use nail clippers to gently clip a sliver off the side of the seed. A metal file can also be used to gently buff the edge of a seed. Only remove a small portion off the edge, until you see the inner white part of a seed. Removing too much can damage the embryo and prevent germination.



**Soak seeds in water overnight.**

Like scarifying, soaking seeds before planting can help prime the seed to germinate. This process synchronizes all seeds so they germinate sooner and together.

**Plant seeds in warm, moist seed starting mix.**



Plant 1-2 seeds per container to ensure at least one seedling emerges. Seed starting mix is recommended. Label seed containers with species name and planting date for reference.



**NATIVE  
AND DESERT-ADAPTED  
TREE SPECIES  
IN THE SONORAN DESERT**

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**PROPAGATION PROTOCOLS  
AND  
GENERAL INFORMATION**

# DESERT HACKBERRY

*Celtis pallida*

The desert hackberry is the perfect small shrubby tree for the bird lovers out there. Birds love the small orange fruit that ripen in the fall when they turn this small shrub into a cacophony of bird activity. The small stature and dense growth of the desert hackberry make this a great choice for planting underneath taller trees to block early morning/late afternoon sun.



Desert hackberry

## About



Flowers

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** White/green

**Geographic Origin:** Sonoran Desert

**Common Name:** Desert hackberry, spiny hackberry

**Family Name:** Ulmaceae

**Botanical Name:** *Celtis pallida*

## Propagation Methods

**Seed Harvest Season:** August to late winter

**Seed Collection:** Picking of fruits is easier when leaves have fallen. Collect before birds eat the fruit. Allow berries to dry completely before storing.

**Seed Treatment:** Soak in water overnight.

**Growing Conditions:** Fall sowing of untreated seeds and Spring sowing of stratified seeds is recommended. Cover berries with 1/2 inch of soil. Seedlings appear in 2-3 weeks after sowing.



Fruit



Spines



Dried fruits with seeds



Seedlings



# NETLEAF HACKBERRY

*Celtis reticulata*

Forms a small sized tree 20-30 feet in height. It has a gray to brownish gray textured bark. The flowers are spherical and very small, averaging 1/2 inch across. The fruits are approximately 1/8 to 1/4 inch in diameter, are colored reddish to purple, and are treasured by native songbirds. The fruits were eaten by the Apache, Chiricahua, and Mescalero tribes, fresh and preserved for food.



Netleaf hackberry

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Yellow-green

**Geographic Origin:** Mountain southwest

**Common Name:** Netleaf hackberry, canyon hackberry

**Family Name:** Cannabaceae

**Botanical Name:** *Celtis reticulata*, *Celtis laevigata*

## Propagation Methods

**Seed Harvest Season:** August to late winter

**Seed Collection:** Harvest mature fruits and remove flesh by soaking in water and rubbing against a screen (wet maceration).

**Seed Treatment:** Soak dried berries in water overnight.

**Growing Conditions:** Sow seeds covering with 1/2 inch of firmed soil. Seedlings appear in 3-4 weeks.



Flowers



Fruit



Bark



Dried fruit with seeds



Seedlings



# CAROB

## *Ceratonia siliqua*

The regal carob is an evergreen, spreading tree with a broad, semi-spherical crown. Sturdy trunks and branches have rough, grey-brown bark. Carob trees are dioecious, with male and female flowers produced on different trees. Only female trees produce pods, but male trees are needed for pollination. The elongated, leguminous pods may be straight or curved and take one year to develop. The ripe pods eventually fall to the ground, from September to November.



Carob tree

### About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Pink

**Geographic Origin:** Mediterranean

**Common Name:** Carob

**Family Name:** Fabaceae

**Botanical Name:** *Ceratonia siliqua*

### Propagation Methods

**Seed Harvest Season:** July to December

**Seed Collection:** Harvest mature fruits. Collect dry seed pods and break open to retrieve seeds.

**Seed Treatment:** Scarify seeds and soak in water overnight.

**Growing Conditions:** Sow seeds covering with 1/2 inch of firmed soil. Seedlings appear in 2-5 weeks after sowing, depending on temperature.



Flowers\*\*



Seed pods\*



Bark



Seeds



Seedlings

\*Photo provided by University of Arizona Campus Arboretum

\*\*Photo provided by Urban Forest Ecosystems Institute at Cal Poly



# DESERT WILLOW

*Chilopsis linearis*

Native tree, fast growth up to 20' tall. Beautiful pink flowers which attract hummingbirds from spring to fall. Deciduous – drops leaves in winter. Low pollen, good for those with allergies! Easy care, low maintenance tree. It has smooth gray bark and soft, willow like leaves. There are naturally multiple trunks, good for a sculptural effect, or can be trained to a single trunk. It provides light, airy shade.



Desert willow tree

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Lavender

**Geographic Origin:** Southwest US, Mexico

**Common Name:** Desert Willow

**Family Name:** Bignoniaceae

**Botanical Name:** *Chilopsis linearis*

## Propagation Methods

**Seed Harvest Season:** September to winter

**Seed Collection:** Seeds are only viable for 1 year. Harvest mature seed pods just before pods open. Lay pods out to dry and collect seed when pods open.

**Seed Treatment:** Soak seeds in water overnight.

**Growing Conditions:** Sow covering with 1/4 inch soil. Seedlings appear in 6–12 days after sowing.



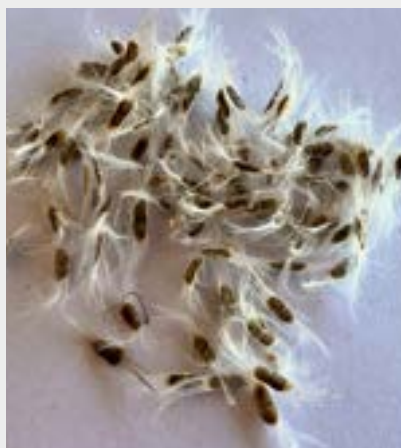
Flowers



Seed pods



Bark



Seeds



Seedlings



# TEXAS MOUNTAIN LAUREL

*Dermatophyllum (Sophora) secundiflora*

Some say the Texas mountain laurel tree flowers smell like grape soda! The Texas mountain laurel tree is a small evergreen tree that matures between 15 to 25 feet tall with a 10 to 12 foot spread. It grows narrow and upright and has dense foliage which can be pruned well in to tree form. The Texas Mountain Laurel blooms in spring and displays dense clusters of purple/blue extremely fragrant flowers.



Texas mountain laurel tree

## About

**Grow Season:** Summer

**Flower Season:** Early Spring

**Flower Color:** Purple

**Geographic Origin:** Texas, Northeast Mexico

**Common Name:** Silver peso, Texas mountain laurel

**Family Name:** Fabaceae

**Botanical Name:** *Dermatophyllum secundiflora*

## Propagation Methods

**Seed Harvest Season:** July to October

**Seed Collection:** Wait until seed pod is dry to harvest. Use pliers to crack open shell. *Caution: Seeds are bright red and poisonous to humans and animals. Keep away from children and pets.*

**Seed Treatment:** Soak seeds in water overnight.

**Growing Conditions:** Grow seeds in moist, fast-draining soil and cover with 1/2 inch of soil.

Seedlings appear 3-5 weeks after sowing.



Flowers



Seed pods



Bark



Seeds



Seedlings



# TEXAS EBONY

## *Ebenopsis ebano*

The Texas Ebony is a slow-growing, drought tolerant evergreen tree that matures to a height of 20 feet by 15 feet wide. It has rich green foliage. The bark may sunburn however if the tree is over pruned. This tree has yellow flowers that bloom late spring to early summer.



Texas ebony tree



Flowers

### About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** White to yellow

**Geographic Origin:** Texas, Northeast Mexico

**Common Name:** Texas ebony

**Family Name:** Fabaceae

**Botanical Name:** *Ebenopsis ebano*

### Propagation Methods

**Seed Harvest Season:** August to November

**Seed Collection:** Wait until seed pod is dry to harvest. Use pliers to crack open shell.

**Seed Treatment:** Scarify and soak seeds in water overnight.

**Growing Conditions:** Grow seeds in moist, fast-draining soil and cover with 1/2 inch of soil.

Seedlings appear in 6-10 days after sowing.



Seed pods



Bark



Seeds



Seedlings



# PALO BLANCO

*Mariosousa (Acacia) willardiana*

This Sonoran desert native is best known for its white peeling bark. Palo blanco means “white stick” in Spanish. It is originally from Sonora, Mexico, so you’ll need to place it somewhere it will stay warmer in the winter. The palo blanco is a shorter weeping tree that has a creamy colored flower in the spring.



Palo blanco tree

## About

**Grow Season:** Fall

**Flower Season:** Spring

**Flower Color:** White

**Geographic Origin:** Sonora, Mexico

**Common Name:** Palo blanco, Willard's acacia

**Family Name:** Fabaceae

**Botanical Name:** *Mariosousa willardiana*

## Propagation Methods

**Seed Harvest Season:** July to November

**Seed Collection:** Collect dry seed pods which are light brown. Pick those that rattle. Extract seeds.

**Seed Treatment:** Soak in water overnight. Select seeds that have not been affected by beetles.

**Growing Conditions:** Grow seeds in moist, fast-draining soil and cover with 1/2 inch of soil.

Seedlings appear 4-10 days after sowing.



Flowers



Seed pods



Bark



Seeds



Seedlings



# DESERT IRONWOOD

*Olneya tesota*

One of the most important, and oldest, plants in the Sonoran Desert. The Desert Ironwood has been estimated to be able to live for almost 800 years! The ironwood acts as a nurse plant, with its canopy providing the ideal shelter and nutrients for many other plants, including the Saguaro cactus. Desert Ironwoods are very thorny and have strong, dense wood. They get beautiful pale pink pea like flowers in late spring and provide excellent habitat for wildlife.



Desert ironwood tree

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Lavender

**Geographic Origin:** Desert Southwest

**Common Name:** Desert ironwood

**Family Name:** Fabaceae

**Botanical Name:** *Olneya tesota*

## Propagation Methods

**Seed Harvest Season:** July to September

**Seed Collection:** Seed pods should be dried for several days to facilitate seed extraction. Fumigate if larvae present.

**Seed Treatment:** Soak seeds in water overnight. Fresh seeds require no treatment except a 12-24hr water soaking.

**Growing Conditions:** Sow seeds and cover with 1/4 inch of soil or sand. Seedlings appear 6-10 days after sowing.



Flowers



Seed pods



Bark



Seeds



Seedlings



# BLUE PALO VERDE

*Parkinsonia (Cercidium) florida*

The Blue palo verde is Arizona's state tree! It is a native tree with moderate to fast growth up to 30'. Bright yellow flowers cover the tree in spring. Unusual blue green bark. Tiny thorns that tend to dissipate as the tree matures. Typically multi-trunked with upright growth. Good for wildlife gardens and attracting pollinators. Offers delicate shade, perfect for patios. Drought deciduous.



Blue palo verde tree

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Yellow

**Geographic Origin:** Desert southwest

**Common Name:** Blue palo verde

**Family Name:** Fabaceae

**Botanical Name:** *Parkinsonia florida*

## Propagation Methods

**Seed Harvest Season:** June to August

**Seed Collection:** Collect dry seed pods that are light brown. Pick those that rattle. Extract seeds.

**Seed Treatment:** Scarify seeds and soak in water overnight.

**Growing Conditions:** Grow seeds in moist, fast-draining soil. Sow 1/2 inch deep and cover with 1/4 inch of soil. Seedlings appear 4-10 days after sowing.



Flowers



Seed pods



Bark



Seeds



Seedlings



# FOOTHILLS PALO VERDE

*Parkinsonia (Cercidium) microphylla*

**Native, slow-growing tree. Can be single or multi-trunked, with thorn-tipped branches and small leaves. Great nesting habitat for native birds. Tolerant of heat, cold and poor soils. In extreme drought or cold, tree may drop leaves. Yellow flowers bloom for a few weeks in late spring, usually following the flowering of the Blue Palo Verdes.**



Foothills palo verde tree



Flowers



Seed pods



Bark

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Yellow

**Geographic Origin:** Desert southwest

**Common Names:** Foothill palo verde, Little leaf palo verde

**Family Name:** Fabaceae

**Botanical Name:** *Parkinsonia microphylla*

## Propagation Methods

**Seed Harvest Season:** June to July

**Seed Collection:** Collect dry seed pods that are light brown. Pick those that rattle. Extract seeds.

**Seed Treatment:** Scarify seeds and soak in water overnight.

**Growing Conditions:** Grow in moist, fast-draining soil and sow 1/4 -1 inch deep and cover with 1/4 inch of soil. Seedlings appear 4-10 days after sowing.



Seeds



Seedlings



# PALO BREA

*Parkinsonia (Cercidium) praecox*

A fast growing tree that matures to 25-30 feet in height with an umbrella like canopy. The Palo Brea has lime green bark and a distinctive sculptural form. It is semi-evergreen with blue-green leaves and small thorns. It has flowers that bloom blight yellow in late spring.



Palo brea tree

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Yellow

**Geographic Origin:** Sonora/Mexican desert

**Common Name:** Palo brea

**Family Name:** Fabaceae

**Botanical Name:** *Parkinsonia praecox*

## Propagation Methods

**Seed Harvest Season:** July to August

**Seed Collection:** Collect dry seed pods that are light brown. Pick those that rattle. Extract seeds.

**Seed Treatment:** Scarify seeds and soak in water overnight.

**Growing Conditions:** Grow seeds in moist, fast-draining soil. Sow 1/2 inch deep and cover with 1/4 inch of soil. Seedlings appear 4-10 days after sowing.



Flowers



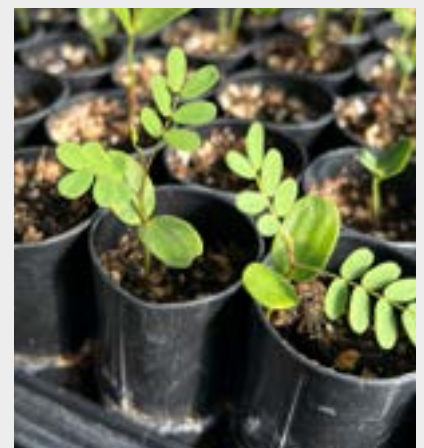
Seed pods



Bark



Seeds



Seedlings



# SCREWBEAN MESQUITE

*Prosopis pubescens*

Easily identified by its unique, clustered, screw-shaped beans, the screwbean mesquite is a small, shrubby and thorny tree native to the Sonoran Desert. The edible bean pods have been used for centuries as a source of food for both early human civilizations, as well as wildlife. Makes for a great street tree when there are overhead power lines in the planting area as they usually don't grow very tall.



Screwbean mesquite tree

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Yellow

**Geographic Origin:** Desert Southwest

**Common Name:** Screwbean mesquite

**Family Name:** Fabaceae

**Botanical Name:** *Prosopis pubescens*

## Propagation Methods

**Seed Harvest Season:** July to September

**Seed Collection:** Harvest mature seed pods just before pods open. Allow seed pods to dry then gently crush the pod to extract seed.

**Seed Treatment:** Soak seeds in water overnight.

**Growing Conditions:** Sow seeds covering with 1/4 inch soil. Seedlings appear 6-10 days after sowing.



Flowers



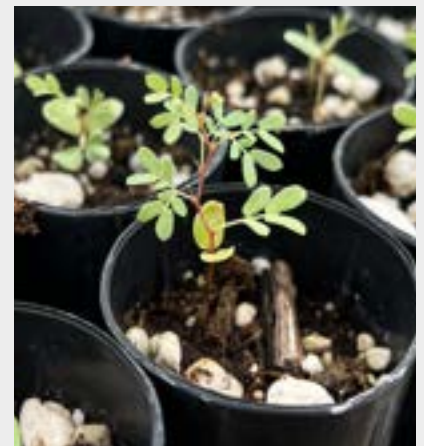
Seed pods



Bark



Seeds



Seedlings



# VELVET MESQUITE

*Prosopis velutina*

The velvet mesquite is a fast growing medium sized tree with thorns that matures up to 40 feet tall and wide. The fern-like leaves and fruit have short dense hairs that give them the appearance of velvet. It is winter deciduous in areas of frost. The Velvet Mesquite produces fragrant spikes of yellow flowers in April and sometimes again in August when it rains. This is an excellent shade tree, but needs a fair amount of room due to horizontal branching.



Velvet mesquite tree

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Yellow

**Geographic Origin:** Desert Southwest

**Common Name:** Velvet mesquite

**Family Name:** Fabaceae

**Botanical Name:** *Prosopis velutina*

## Propagation Methods

**Seed Harvest Season:** June to September

**Seed Collection:** Harvest mature seed pods just before pods open. Allow seed pods to dry then gently crush the pod to extract seed.

**Seed Treatment:** Soak seeds in water overnight.

**Growing Conditions:** Sow seeds covering with 1/4 inch soil. Seedlings appear 6-10 days after sowing.



Flowers



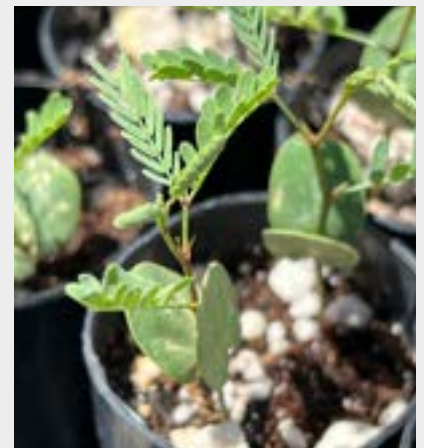
Seed pods



Bark



Seeds



Seedlings



# CATCLAW ACACIA

*Senegalia (Acacia) greggii*

Native tree, moderate growth to 20' tall. Fragrant cream or yellow catkins. It has dry seed pods that curl, and attracts native birds. There are curved thorns, resembling the namesake catclaw. It has a dense branch structure with gray-green leaves which drop in the winter. It is very tolerant of both drought and cold, and is effective as a screen or barrier. Catclaw is often multi-trunked and shrubby, but can be trained to a single trunk. It is excellent for honey production!



Flowers

## About

**Grow Season:** Summer

**Flower Season:** Spring

**Flower Color:** Yellow

**Geographic Origin:** Desert Southwest

**Common Name:** Catclaw acacia

**Family Name:** Fabaceae

**Botanical Name:** *Senegalia greggii*



Catclaw acacia tree

## Propagation Methods

**Seed Harvest Season:** July to September

**Seed Collection:** Collect dry seed pods and crack open to retrieve seeds.

**Seed Treatment:** Scarify seeds and soak in water overnight.

**Growing Conditions:** Grow seeds in moist, fast-draining soil and sow 1/2 inch deep and cover. Seedlings appear 4-10 days after sowing.



Seed pods



Catclaw spines



Seeds



Seedlings



# WHITETHORN ACACIA

*Vachellia (Acacia) constricta*

The Whitethorn acacia is a slow growing, long-lived shrub or small tree that matures to a height of 10 to 20 feet tall and wide. Stems are reddish purple. Young plants have inch-long, white thorns, although older branches are often thornless. It has yellow fragrant puffball flowers that appear in late spring and in late summer with sufficient water. This tree attracts birds and other wildlife and adds nitrogen to the soil.



Whitethorn acacia tree



Flowers



Seed pods



Bark and spines

## About

**Grow Season:** Spring

**Flower Season:** Spring

**Flower Color:** Yellow

**Geographic Origin:** Desert Southwest

**Common Name:** Whitethorn acacia

**Family Name:** Fabaceae

**Botanical Name:** *Vachellia constricta*

## Propagation Methods

**Seed Harvest Season:** July to September

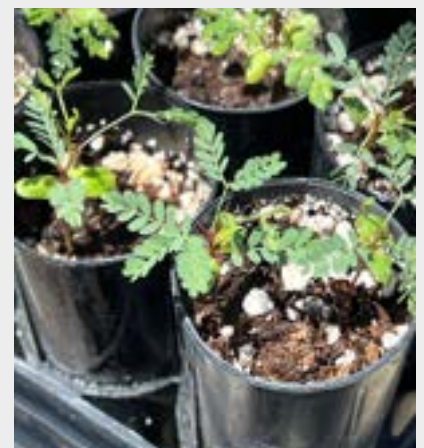
**Seed Collection:** Collect dry seed pods and crack open to retrieve seeds.

**Seed Treatment:** Scarify seeds and soak in water overnight.

**Growing Conditions:** Grow seeds in moist, fast-draining soil and sow 1/2 inch deep and cover. Seedlings appear 4-10 days after sowing.



Seeds



Seedlings

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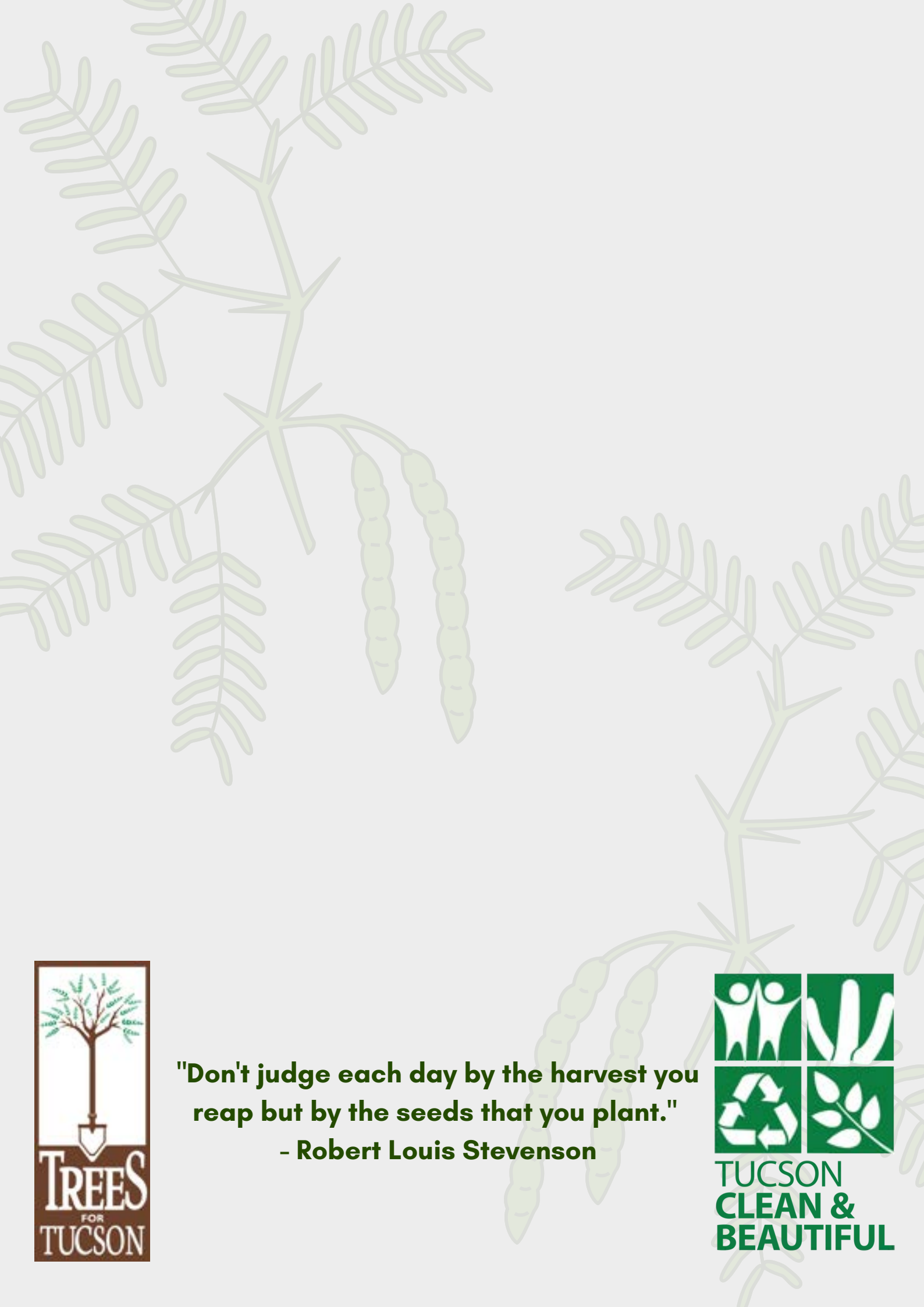
# ACKNOWLEDGEMENTS

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I would like to acknowledge and express my gratitude towards everyone who helped make this propagation protocol booklet possible. I am especially grateful for my Trees For Tucson supervisor, Rebecca Johnstone, for teaching me how to collect and prepare desert tree seeds. Even with all of the thorns and pokes along the way, I learned so much from the hands-on experience Rebecca provided. I also want to thank Rebecca for the list and information she collected from her years of experience from planting and growing these native and desert-adapted trees. Much of the information provided from Rebecca's experience with Trees For Tucson helped make this booklet possible.

I would also like to thank my academic mentor and internship supervisor Professor Tanya M. Quist from the University of Arizona Plant Sciences Department. Thank you for guiding me and teaching me the plant science of the propagation techniques we used throughout my internship with Trees For Tucson. I appreciate the time and dedication Professor Quist spent with me on making this booklet come to fruition. In addition, the University of Arizona Campus Arboretum, which she directs, was an immense resource in collecting data, general information, and photographs on the individual tree species listed in this booklet. Please note, all photos marked with a \* are from the University of Arizona Arboretum's Species pages.

Lastly, I would like to thank Tucson Clean & Beautiful, Americorps, and Northern Arizona University Center for Service and Volunteerism for my internship opportunity as a Tree Propagation Intern. I am beyond thankful to everyone who encouraged me throughout my internship, especially John Mecklin who checked-in with me every month. I am so grateful I had the opportunity to grow native and desert-adapted trees while serving our Tucson community and making the world a little greener, one seed and one tree at a time.



**"Don't judge each day by the harvest you  
reap but by the seeds that you plant."**

**- Robert Louis Stevenson**



**TUCSON  
CLEAN &  
BEAUTIFUL**