

## Madagascar Palm Background Info

The Madagascar Palm is native to Madagascar and is an arid tropical succulent. It has a thick, silvery trunk that will reach 15 feet in nature and over one foot tall in a single year. As a houseplant, they are much smaller. The sharp stiff needles that grow along the trunk act as a defense to keep animals from feeding on them. The leaves form only at the top of the trunk, like a palm tree. It is not a palm, but is in the cactus and succulent category.

The Madagascar Palm flowers in the spring and summer. Saucer-shaped white flowers will only appear on mature plants that are grown outside, and they are lightly fragrant. Prior to its first bloom in the spring, this palm produces amazing seed pods that look like cucumbers. If the seed pods are left alone, they eventually open along the seams revealing great numbers of white winged seeds. Planting the seeds results in a remarkable yield of new plants that sprout in 3-4 days.

## Madagascar Palm Growing Info

Trees are very heat and drought tolerant, but Madagascar Palms do not handle cold conditions well. You may consider keeping them indoors as a houseplant in your area. In tropical climates, transplant outside after trees are 6-8 inches tall. They prefer full sun but can be planted in part shade. Sandy soil with peat moss and excellent drainage is recommended. When handling your trees, it is useful to wrap stems in several layers of newspaper to protect your hands. Water light but consistently and fertilize heavily for maximum growth, speed, and beauty. The Madagascar Palm's thick fleshy trunks can store water. The palm needs to remain dry in the winter during dormancy.

## How the Sensitive Plant Works

The Sensitive Plant, *Mimosa pudica*, is well known for its rapid plant movement. In the evening the leaflets will fold together and the whole leaf droops downward. It then re-opens at sunrise. The changing of the positions of the leaves at night has been termed nyctinastic movement. Leaves close when touched, shaken, or rapidly heated or cooled. Involuntary response to a mechanical stimulation is called thigmonasty. The stimulus can also be transmitted to neighboring leaves. The movement is caused by "a rapid loss of pressure in strategically situated cells that cause the leaves to droop right before one's eyes." The foliage re-opens slowly about 1 hour after being touched. This carefree plant will bloom

breathhtaking small, pink, ball-like flowers in the Spring and will bloom within the first year.

## Care for the Sensitive Plant

Sensitive Plants prefer bright light and like to dry out between watering. Most failures are due to over watering. Be sure to mist them if you transplant them as they like high levels of humidity.

## Germination Experiments: Sensitive Plant & Madagascar Palm

1. Soak half of each type of seed in water 20-60 minutes.
2. Add germination mix to all six terrariums.
3. Mix perlite with the mix in two of the terrariums.
4. Wet the soil with equal amounts of water (about 5 oz each.)
5. Label each terrarium:
 

Sensitive Sun	Sensitive Dark	Sensitive Perlite
Palm Sun	Palm Dark	Palm Perlite

 Label one half of each for soaked seeds and the other for dry seeds.
6. Equally space seeds 4 soaked palm seeds and 4 dry palm seeds in each of 3 terrariums. Equally space seeds 6 soaked and 6 dry Sensitive seeds in each of 3 terrariums.
7. Press all seeds lightly into soil, but only cover half of them with about ¼ inch of soil - Cover the ones in the middle and leave the ones on the edge uncovered.
8. Attach terrarium lids.
9. Place one of the non-perlite terrariums for each plant in a dark location (closet.)  
Place the other terrarium in a sunny location (windowsill.)
10. Wait and watch for 2 weeks.

Do the soaked or dry seeds sprout first?

Do those in perlite or plain soil sprout first?

Do the seeds on top of the soil or under the soil sprout first? Do those in the sun or the dark sprout first? Do they look different?

Do any of the conditions result in no sprouts?

Do the Sensitive Plants and Madagascar Palm have different ideal conditions?

If the terrariums in the dark sprouted, you can leave them in the dark up to a week. Then move them to a sunny location. If they have no sprouts, move them about one week after those in the sun sprouted. Now do they sprout?

## Terrariums & Water

Do you have Madagascar Palms in each of the three terrariums? If not, carefully transplant some so that you have 3 terrariums with similar palms. Leave the lid on the terrarium with perlite and one of the others. Remove the lid from one of the terrariums with plain soil. Place all in the same sunny location. Watch for a few weeks; observe the plant growth and water retention. Whenever the soil in the open terrarium gets dry, water the other one with plain soil, too - about 1 ounce of water each. How do terrariums affect the growth rate of plants? How much water is too much? Madagascar Palms store water in their trunks. Are the trunk sizes in the 3 terrariums different?

## Do Sensitive Plants React to Touch?

Wait until a Sensitive Plant is at least one week old. Gently touch it. What happens?

Compare the Sensitive Plants when touched, shaken and blown on. Do they all close? How long does it take for them to open again?

## Do Sensitive Plants Respond to Temperature Changes?

As you move the Sensitive Plants for this experiment, be careful not to touch or shake them. Put one of the Sensitive Plants in a very cold place (such as a refrigerator) for about 10 minutes. Because refrigerators are both dark and cold, put the other two Sensitive Plants in a dark closet. After 10 minutes, take one of them out and compare to the one in the refrigerator. After 20 minutes, take the other one out of the closet. Were the leaves on the plants completely closed? How did the cooler temperatures affect the plant's response to touch? How long does it take each to open after being returned to a warmer temperature?

## Circadian Movements

Sensitive Plant foliage closes at night and opens again in the morning under normal light conditions. What happens when you place one terrarium in a completely dark area for two days? (Try a closet with no gaps in the door and no peeking! Even a short exposure to light can affect the plants.) What happens when you leave a plant exposed to light 24 hours a day? (Place one of the terrarium under a lamp that can be left on overnight.) Leave the third

terrarium on a windowsill, as a control. (Make sure it is not exposed to the overnight lamplight.)

## Compare the Root Structure of Sensitive Plants & Madagascar Palms

Carefully dig up mature plants from the terrariums. Do these two plants have the same root structure? Why are roots important to plants?

## Discussion Questions

1. What are two things that trigger germination? Are they the same for all plants?
2. How do terrariums work?
3. What is thigmonasty? How does the Sensitive Plant move in response to touch?
4. What are circadian rhythms? Give an example.

## Notes

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