

Concerning airplants

There are many articles about airplants (*Tillandsia* spp.) out there. Many are based on years of experience with growing these fascinating and sometimes bizarre-looking plants. Some merely repeat what other articles say. Some have ideas that don't make a whole lot of sense. I'm going to repeat some of what is known from botanical studies, and debunk a few things about growing them. They make good house and office plants. There are two parts to this: the science part and the how-to part.

The science part: Introduction

Airplants are members of the plant genus [*Tillandsia*](#), which is in the family [Bromeliaceae](#), known informally as bromeliads. They are perennial evergreen flowering plants that are [epiphytes](#), meaning they grow on another plant, or some other substrate other than soil. Most of them have a [rosette](#) arrangement of their leaves. They absorb water and nutrients through trichomes, which are cells on the outsides of their leaves. They have no roots, and they stay in one place with anchors ("holdfasts") that look like roots. The anchors might be modified trichomes; apparently this is not known for certain.

Wikipedia says: "They have naturally been established in diverse environments such as equatorial tropical rain forests, high elevation Andes mountains, rocky ("saxicolous") regions, and Louisiana swamps, such as Spanish moss (*T. usneoides*), a species that grows atop tree limbs. But there are also species that are lithophytically, on rocks (but also roofs and even telephone wires)."

"The green species with their claim to a cool-humid climate live mostly more in the shade terrestrial or in the lower levels of the forests. In contrast, almost all gray species live in precipitation-poor areas with high humidity. They prefer the full sun and can therefore be found in the upper floors of the woods, on rocks or (rarely) on the ground. Many of the gray species are epiphytes. Some species are more or less xeromorphic." – wikipedia

These paragraphs are apparently google-translated from German articles, and it might not be acceptable to transmogrify "mostly more in the shade terrestrial" into better English, because no one knows what it means. Thus, this essay, which was begun in an attempt to fix the poorly-worded wikipedia article, is now merely mine – with my opinions.

In Central Texas, where I live, ball moss (*T. recurvata*) is able to survive a month of drought during average daytime temperatures of 90F or more. This doesn't make them a kind of cactus. They are picking up dew in the early morning and soaking up as much water as possible in the occasional 30-second rain shower. The essential characteristic of airplants is that they dry out, then they get wet, and they dry out.

Kinds of airplants

There are an estimated 650 species of airplants. Wikipedia says they are native to the forests, mountains and deserts of northern Mexico and south-eastern United States, Mesoamerica and the Caribbean to mid-Argentina. They are ecologically diverse: they are found in many different habitats and environments.

As far as the actual taxonomy is concerned, there may be more than the estimated 650 species or fewer. The genus *Tillandsia* is incredibly diverse in appearance, size, and habitat. I do not entirely accept the wikipedia article's statement that green ones live in a cool-humid climate, mostly in the shade or in the lower levels of the forests. Nor do I accept that grey ones live in precipitation-poor areas with high humidity. These generalizations seem simplistic.

This is anecdotal: I have two "*T. ionantha*" with completely different flowers. One has the blue spike coming from the center of the rosette that you will find by googling (I submitted my picture to wikipedia, and here it is) but the other put out a feathery structure from the side. I doubt that they are the same species. Plants of the same species have flowers that look alike, even if their vegetation looks different. Plants of different species have different flowers: this is about sex. A pollinator, pleased by a flower, will go to a similar flower. However, they were both sold as *T. ionantha*. One is the variety "Guatemala" (the "blue-spike" one) and the other is "Fuego." The plants look similar but not the flowers. The science of taxonomy relies on resemblances until more information is known. DNA testing will probably give us some answers. It may be that there is more than one genus of airplants, but only a [cladistic](#) analysis will make that certain.



T. ionantha flowering

Wikipedia says that some airplants have a [Crassulacean acid metabolism](#) (CAM), but apparently some don't. That is enough to suggest to me that "standard rules" for growing airplants might not always be good rules (although I suggest some rules below), and moreover, that the genus *Tillandsia* should probably be divided into two or more genera.

The Crassulacean acid metabolism is usually used by plants adapted to an arid environment. This metabolism, also called CAM [photosynthesis](#), is a way of dividing photosynthesis into two parts to conserve water. In CAM photosynthesis, the plant collects carbon dioxide and oxygen at night, opening its [stomata](#). The plant uses the carbon dioxide to produce malate ($C_4H_6O_5$), which it stores. Malate is an important biochemical compound related to the organic acid malic acid. Malic acid, like citric acid and tartaric acid, gives fruit a sour (but tasty) flavor. "Malic" and "malate" are derived from the Latin word for apple, "mālum."

Both plants and animals use the [Krebs cycle](#), also called the citric acid cycle. The Krebs cycle uses oxygen to convert fats, proteins and carbohydrates into carbon dioxide (and some waste products) and generate energy. Malate, which is a sort of carbohydrate, is used in the Krebs cycle. As you can see by the diagram in the linked page on the Krebs cycle, malate is two steps ahead of citrate in the Krebs cycle. By storing malate, airplants (and other plants that use the CAM cycle) store energy to be used later. Many plants store citrate, but that requires more water. Citrus fruits, like an orange, contain quite a bit of water, so that if the seed within the fruit sprouts, the new plant has a head start. The seeds of airplants, described below, have very little water.

How does this work for airplants? Airplants generally do not need or like direct sunlight, so their photosynthesis is slow, and airplants do not grow very fast. Airplants do not get water from the ground, or waste it. By storing malate, slowly, an airplant can accumulate enough of it to suddenly use it. They put the Krebs cycle to work and get enough energy to reproduce and make pups.

Life Cycle

A healthy airplant appears to be doing not much of anything. It doesn't get noticeably bigger once it's reached a certain size. You'll have to take photos of it to notice how it changes. It may turn a greener or darker color over a period of several months or a year. It may look like it's powdered, which indicates that it is making minute fuzzy trichomes for collecting water, etc. It may turn reddish, like the *T.*

ionantha is the photo above. That may be the only sign that it is growing, although obsessively counting the number of leaves will tell you that it is growing also. Suddenly, perhaps after years, it puts out an interesting flower, which may persist for some time. Then the plant makes offsets, a.k.a “pups”: smaller versions of itself attached to the parent plant. The parent plant, having used up all its resources and provided for the next generation, then “dies.” That means that it will not make another flower, because airplants flower only once. However, the parent plant may remain for a long time as a support for its pups. The pups then flower eventually, but there is no schedule.

Note that airplants have both sexual reproduction (flowering) and asexual or vegetative reproduction (making offsets). This raises some interesting ecological questions, such as: why do they use both kinds of reproduction? Is it because the chances of successful pollination are low? Do they produce much nectar, or are pollinators attracted by the colors of the flowers? Do all the airplants of a species in a certain area flower at the same time, so they maximize the chances of getting pollinated? (That is what most plants do, but they follow the seasons.) Does anyone know the answers?

What is known: flowers are visited by moths, hummingbirds and sometimes bats. Obviously this isn’t going to happen indoors, and an airplant cannot pollinate itself. (There have been a few reports of self-pollination.) Therefore, growing airplants in the house generally means that they reproduce by making pups, which is acceptable and looks very cool. It takes time but a “cluster“ of plants can develop. You can divide the cluster and have plants to give away, or grow them separately.

The flowers, if they are pollinated, produce seeds just as other plants do. The seeds are very light and have parachutes like dandelion seeds, to be carried by the wind. Therefore they disperse widely and many seeds are lost, but many also may find a suitable home. A single pollinated plant probably produces many seeds.

Environment

Many airplants, perhaps all, are adapted for an arid environment, or an environment with only occasional rain. This is presumably one reason why they have no roots to extract water from the ground. In fact, they will rot and die (like a cactus that



Curly-type airplant on a piece of bark. Species unknown.

is over-watered) if they are planted in soil like most plants. They generally grow on tree branches, rocks, or wherever they can, such as roofs and [telephone wires](#). Desert species apparently may grow on the ground if it is dry.

In any event, there are many kinds of airplants. The commercially available ones are the easiest to grow, undoubtedly. If you bring home (or smuggle) an airplant from your tropical vacation, try to give it a place like the place where you found it. The best way to grow an airplant is to imitate its natural environment as much as you can. If it was growing on a branch, or a rock, or upon dry sand, try to give it a similar home.

Growing airplants: this is the how-to section

Let me make this plain: growing airplants takes time. You may have one that never flowers until you have had it for a year or two, maybe more. That doesn't mean that you are doing anything wrong. Airplants run on their own schedule. You simply need to take care of it, which is not very difficult. With proper care, an airplant and its pups live forever.

Air

Airplants need air. They need it for two reasons:

1) To dry out after they get wet. This is not a problem outside where they are exposed to the wind, but indoors, where the air is not moving well, it can be an issue. Placing them by an open window is not always practical, because of temperature (see below). Air conditioning will lower the humidity and circulate the air somewhat, but don't place the plant directly in front of the AC vent; that is too cold. Otherwise, air conditioning is fine. If you have no air movement, you need an electric fan anyway, for your own sake.

2) Air contains nutrients. Not as many nutrients as soil, but that is the way airplants live. Dust is made of tiny particles of many things: soil, plant matter, insect feces, and everything else that is in the environment but usually comes in bigger pieces. I advise you not to research what is in the dust you breathe, because you might lose the confidence to breathe. Doctor's offices and especially surgery rooms filter the air, as do places where electronics are made and vehicles for the space program are

constructed. An airplant will happily gobble up air-borne pathogens such as bacteria, and capture dust mites and fungus.

There is much less exposure to wind-blown dust indoors, and you might use a fertilizer. It is not really necessary, but there are inexpensive powdered fertilizers formulated for airplants that can be mixed with water. At the recommended dilution, one-quarter teaspoon per gallon of water, a small amount will last a long time.

Some things you may read about airplants

1. Airplants in general do not like direct sunlight.

This is generally true. In nature, they usually grow on branches of trees, where they are shaded by the leaves of the trees from direct sun. As in all things, there are exceptions. “Ball moss”, common in the southern USA, will tolerate direct sun (at least for part of a day) and has been seen growing on telephone wires. Ball moss also grows on deciduous trees and may be exposed to full winter sun for a couple of months a year. It’s doubtful that it could stand direct summer sun all day.

Since you do not have a tree indoors to grow your airplant under, they will do fine in a window with filtered light, such as venetian blinds or frosted glass. A window on the north side of the house is fine, but it might have direct sun for a few months of the year, so watch for that.

There are tropical species that grow on rocks, but maybe these are only found on the partly shaded parts of rocks; I have not read anything about that. There are ones that grow in deserts. For the species that you are likely to buy commercially this rule holds true.

As far as I can tell, all airplants grow well under artificial light. Grow-lights made of LRDs might be best, but some people grow them in places where there is no regular source of light; e. g. on the refrigerator door or in the bathroom. This probably works best if the kitchen or bathroom light is on all day, and is reasonably bright as the lights in those rooms usually are. They should be close to the light. The bright lights of an office environment are fine.

A word about airplants in the bathroom: I have one. It gets good light from the lights over the sink and it has been doing well for years. But the bathroom is not necessarily an arid



Airplant grown in bathroom

environment. When you take a shower and steam up the mirror, you are watering the plant. This might be enough water for the plant to survive. If there are several people steaming up the bathroom every day, the plant might never dry out and it will die. The solution is to get air circulating. If your bathroom doesn't have a window, get a fan. (A bathroom with no air circulation will develop mold and mildew, anyway, so this is good for you, too.) If you have a window but the temperature (see below) gets too cold for the plant, then you may need a fan as well. My airplant gets regular waterings, and also gets some water from the shower, but it is doing well because I run a fan to dry out the bathroom.

I am not aware of any information regarding a light cycle or circadian rhythms. Many plants are stimulated to flower when the day is getting longer (blooming in Spring) or is getting shorter (blooming in Autumn). Airplants don't seem to care. They will probably tolerate an office environment in which the lights are turned off on Saturday and Sunday. Airplants and other plants get no light for a few days when they are shipped, and they suffer no harm. Airplants might tolerate a busy office where the lights are on 24/7/365, which would drive most plants crazy. In nature, their exposure to light is irregular and they have probably evolved to live with whatever happens with light. Since an airplant only flowers once, flowering is not determined by the season, but by when it is ready.

2. Airplants are hard to grow

This statement, I think, has been made by people who treated an airplant like an ordinary plant. You can't grow them in dirt, you can't keep them wet, and you do not have to worry if they dry out. Airplants don't show any signs of wilt when they dry out (and they must dry out), and if you allow them to stay wet, they will rot and die before you realize what's happening.

Note: I gave away an airplant recently that I had mounted on a piece of bark. I asked a few weeks later how it was doing, and I was told that the person had put a thimble under it to hold water. When I put an airplant on bark, I intentionally drill a hole all the way through so that water can drain out. I told this person to get rid of the thimble, because keeping the plant wet will kill it. The person claimed they did not get the half-page instruction sheet that I give with an airplant, which is the very condensed version* of what you are reading now. I know I did give it to them. Airplants are easy to grow, but they can't be grown like ordinary plants.

In nature, they depend on rainfall and dew. They may get only intermittent rainfall and they do not have roots to extract water from the soil. In the tropics, in the dry season, they may go for a couple of weeks

without any rain. In the rainy season, they may get rain every day, but they are built to shed excess water and take only a certain amount. And the rainy season in the tropics does not mean constant rain; it usually rains every day, but not all day. This gives the plant a chance to dry out. Also, they have more air and wind outdoors.

Most important, I think, is growing them on the right medium: a piece of natural wood, a porous rock (such as limestone), a bed of small rocks with drainage (probably not small gravel or sand, because it might hold water by surface tension), the convex side of a piece of unglazed clay pot, a wire hanger or any other substrate that allows water to leave the plant and then evaporate or drain away. If they are in any kind of container, it should have a hole in the bottom for drainage. I have seen airplants for sale at the supermarket in attractive little glazed clay pots with no drainage. They intend you to buy the cute little exotic plant, kill it and buy another. Don't do that.



Ball moss (T. recurvata) growing on a window screen

You can string wires across a window and grow them there, even upside down, although that is not very attractive. Please note my ball moss, wired to a window screen on the north side of my apartment, overlooking downtown Austin. I found this plant on the ground. I like to think I rescued it. It wouldn't last long on the ground. Eventually, I expect it to flower (ball mass has small purple or blue flowers on stalks) and produce pups both inside and outside the screen. The important thing is that there is no way for water to accumulate on it, and it gets plenty of air. The downside is that my girlfriend says it looks like a giant bug on the window. Ball moss is not a very attractive airplant. I have to agree with that.

For mounting them on pieces of wood, bark or rock, use a drop of silicone sealant (which is non-toxic) to hold them in place. I think people who suggest superglue have no sense. You might have to try more than once with silicone sealant but it won't damage the plant. Just drill or carve out a place for them to reside and glue a side of the plant in place. Don't glue the "belly-button" or whatever you want to call it that an airplant has at the very bottom. Eventually, the plant will put out "holdfasts" from the belly-button to hold itself in place.

The practice of growing an airplant in a glass bulb or a seashell is dangerous in my opinion, because water can accumulate unseen inside the glass bulb, under the plant, and before you know it, it's rotting

and dying. The glass container may be open to the air but a little water built up in the bottom can cause a problem. I do not recommend any kind of non-porous surface as a place to grow your airplant, unless it is slanted to allow water to run off easily. For instance, roofs are not porous, but they have a rough texture and are made to shed water, and airplants have been seen growing on roofs.

However, you also have to consider that airplants have to hold on to the substrate. They can't hold on to glass. That makes natural wood and porous rocks your best bets: roofing materials are generally not attractive. Above, I suggested a piece of unglazed clay pot, but I haven't tried that. The pups might not be able to hold on unless it's rough enough, or they are a kind that grows on that kind of substrate naturally.

Watering Airplants

There are three ways to water airplants: soaking, pouring and spraying/misting. Whatever way you use, the plant must dry out completely before you water again.

One thing that is said by some people is not to use distilled water. They then go on to tell you to use rainwater. Distilled water is as close to rainwater as you can get, without actually collecting rainwater, so that makes little sense. It is true that rainwater may have some beneficial nutrients from the air, and then you don't have to fertilize as much; although you don't need to fertilize very much, anyway.

Then they say that if you do not have rainwater, use tap water. Do not use tap water because it contains 1) chlorine or fluorine compounds, added by your water utility for bacterial control and for your teeth, and may contain 2) calcium carbonate, found in "hard water," which is essentially dissolved limestone, and may contain 3) impurities such as lead or copper from your pipes (which is not good for you, either) or 4) water softeners, to counteract your "hard water" so washing machines work more effectively, and whatever else your local water supply adds to your water.

Furthermore, if you mist your plants, the stuff in the tap water will clog up your mist gadget. If you live in a place like Austin, Texas, where the showerhead gets clogged up and you have to take it apart at intervals to remove little limestone rocks from it, don't put that water on your plants. That goes for all plants, not just airplants. Watering ordinary plants with tap water in Austin means that eventually you will see the limestone residue on the pot in which the plant grows. It is said by some persons who

suggest tap water that it contains nutrients. It doesn't. Plants, including airplants, do NOT acquire any nutrients from tap water. It doesn't have nutrients, or it shouldn't.

Purified tap water, with one of the filters that you can buy to make your water suitable for drinking, should be OK. You want to avoid any buildup of calcium carbonate or metals on the leaves of the plant. It is my understanding that the filters for drinking water remove large ions such as calcium carbonate and metals. I use distilled water for all my airplants. Bottled water should be OK, but all those plastic bottles are not a good thing. Distilled water also comes in bottles, but you can buy a water distiller just as you can get a water purifier, although a water distiller is more expensive.

Let's say that if you live in a rural area and have clear-running creek water, and you are sure that it contains no dissolved metals, and it isn't of a limestone origin (check the pH, it should be between 6 and 7); then you can use that. It probably contains some micro-organisms that will fertilize your plants. Rainwater might also contain some tiny critters, algae and dust that will be fertilizer. If you have a healthy freshwater aquarium, you can use water from that.

Most articles about airplants suggest that you soak them in a bowl of water. This is not what happens to them in nature, although it's probably similar to a heavy rain. The only caveat, again, is make sure that the plant dries out completely before soaking again. Soaking once a month or less frequently should be enough. It's not necessary, at all. I never do it.

I don't like dunking the plant in water. I prefer either misting or pouring water over it. If I spray it and mist it I don't have to move the plant, and I'm concerned about letting it sit in water where I might forget about it. I have discovered that hairdressers use a sprayer that makes mist that is very suitable, and costs only about \$10. Twice a week, I spray my plants until they are wet. A single squirt won't do it. Get them very wet, and then let them dry. That's the way they live in nature.

You can also put the airplant in the sink and gently pour some good water over it. This is NOT the way to do it if you are growing it in a glass bulb or a similar container, unless you can hang it upside down for a few hours for all the excess water to drip out.

If you keep your airplants outside when the weather isn't too hot or cold, you can take a suitable amount of good water and pour it over them every few days, if they haven't been rained on. Or, you

can take them out in the morning before the weather gets too hot. Let the water run off and let the wind dry them. You must take care to watch the temperature for airplants kept outside; see temperature, below.

Humidity

Airplants are not fussy about humidity. Because airplants do not get water through their roots – because they have no roots – they get water from the air, usually from rain, and absorb it through their leaves. Wikipedia says they close their stomata (the openings through which they breathe) during the day to prevent water loss. They open them at night to fix carbon dioxide and release oxygen (which is normal for plants). “This allows them to preserve water, necessary because they are epiphytes.” – wikipedia.

All plants can close stomata to keep water from escaping. But because airplants have only intermittent water and can't get it from the ground, they may depend on ambient humidity to maintain their water balance when they open their stomata at night. Or, if a plant is really dry, it might not open its stomata at all. Because they are adapted to an arid way of life, airplants are not really fussy. The minimal care they need is one thing that makes airplants popular.

If they are indoors, they will tolerate air conditioning better than most plants. Always make sure your plant dries out between waterings. If in doubt, don't water. It's best to stick to a regular schedule. The presence of other plants is probably beneficial, because they will help maintain a constant humidity.

Temperature

Although airplants are considered to be “tropical” plants, that doesn't mean they need a greenhouse with a high temperature and humidity. I have known commercial bromeliad growers and compared to what they have to do with temperature and humidity, it's easy to grow airplants. (It may surprise you to learn that there are bromeliads, besides airplants, and also orchids, that grow in desert environments.) The bottom line is that any temperature that's comfortable for you, say, 60F to 80F, is fine for your airplants. This is another reason why they are popular indoor plants.

If you keep them outside, bring them in if the forecast says the temperature will go below 50F or if the daytime temperature goes over 80F. Fifty degrees is about the bottom limit of the airplants you can buy. As always, there are exceptions: *T. usneoides*, known commonly as Spanish moss, can tolerate frosts

down to about -10°C. Ball moss, *T. recurvata* (see above), its close relative, has a similar tolerance to low temperatures, and it tolerates temperatures of more than 100F. The ball moss on my window screen lived through the Big Freeze in Austin in February, 2021. Neither of these plants are very colorful, and you probably don't want Spanish moss hanging from the ceiling (that's creepy), but they are adapted to the sub-tropical, changing climate of the Southern USA.

For a while, I tried moving my airplants outside and pouring water over them twice a week. They did fine. But I got tired of that and started spraying them in place, instead, in the nearly constant indoor temperature.

Indoor temperatures, the ones you like, 60F to 80F, are best. Again, this makes them ideal indoor plants.

Fertilization

I have sometimes used a commercial fertilizer for airplants that has a 20-10-20 ratio. This is the Nitrogen-Phosphorus-Potassium ratio. It claims to be “urea nitrogen” free, boron free, dye free, copper free, and zinc free.

All this is very well except the “urea nitrogen free” because urea is probably a common natural source of nitrogen for an air plant. Perhaps the intention is to make their product sound like it is vegetarian and no one pissed in it. I have no idea. As for dye, yes, of course. However, all living things need boron, copper and zinc in trace amounts; they are called “[essential micronutrients](#).” They are all probably present in trace quantities in the air. It is somewhat troubling that the label of this fertilizer brags about not containing these elements, but of course plants can get too much of them and be poisoned, just like animals.

Commercial spray fertilizers, like that one, are surely good enough. The air itself supplies other nutrients. Airplants in your house obtain others by chance: the stray bug, a sneeze. The smell of chicken soup contains molecules of food, or you wouldn't be able to smell it. The natural environment has many more smells and food sources, and contains tiny animals such as dust mites.

If you think your airplant really needs fertilization, which it does not if it gets sufficient moving air, then you can piss on it. That might be its main source of fertilizer in nature: birds, monkeys, lizards,

insect droppings, etc. Yes, I am kidding. It is true, but don't do it. The bark or the rock it's growing on will acquire an unpleasant odor.

Enclosures

I grow some airplants in a terrarium. Many people say not to do this. They are right, if you do it wrong. Let me explain how to do it.

Problems:

1. No circulating air.
2. Too wet.

Solutions:

1. Use an aquarium air pump to supply a constant source of air. You can get a quiet one for less than \$10. You need some tubing, which is usually sold separately. If you need more air because you just watered, put the top askew.
2. Do not overwater, and of course don't plant airplants in soil or any substrate that doesn't drain. If you see condensation on the sides of the terrarium, remove the top or put it askew so air circulates, and let it dry out.

My routine is to let the terrarium alone for 3 to 4 days, and then water. Watering consists of misting the airplants heavily. I leave the top of the terrarium askew to allow it to dry out, then I put the top back on and the grow lights on top.

Airplant Art

I have a word about airplant art.

I am not a visual artist and I hardly know what it means. Nevertheless I have arranged airplants in ways that seem to appeal to other people. You can hunt for rocks, branches or bark and put your airplants on them.

Here are two *T. ionanatha* on a limestone rock:



Here are some airplants on a piece of cypress bark, which I scavenged. Someone told me, jokingly, that it was “horrificing.”



***Air Plant Care**

Light: Bright light but not direct sunlight. A window sill without direct sun is good. A brightly lit room with fluorescent lights or LEDs, like an office, is also good. The light can be on as much as is convenient for you. Air plants do not seem to require a light schedule.

Water: Once or twice a week, put the airplant in the sink and gently pour some room temperature distilled or bottled water over it. Get it good and wet. Do not use tap water. It should dry out in a few hours. You can also use a sprayer or mister. Immersing the plant in water, as suggested by many, is not necessary. In nature, they get rainwater, fog and mist.

Air plants **MUST** dry out between waterings. The easiest way to kill an air plant is to water it too much. When in doubt, don't. They can go without water for a couple of weeks.

Fertilizer: Not necessary if the plant gets plenty of air. Commercial powdered fertilizer to be mixed with water is available at a low price. It is not needed.

Temperature: Room temperature. Air conditioning is fine. Air plants can be put outside if the temperature is between 50F and 80F. They do not like excessive heat or cold – just like you.

Growing medium: Airplants do not grow in dirt. In nature, they grow on rocks and tree branches. Do not try to grow one in dirt.

They grow slowly. If you doubt that it is growing, take a picture once a month. You will see.