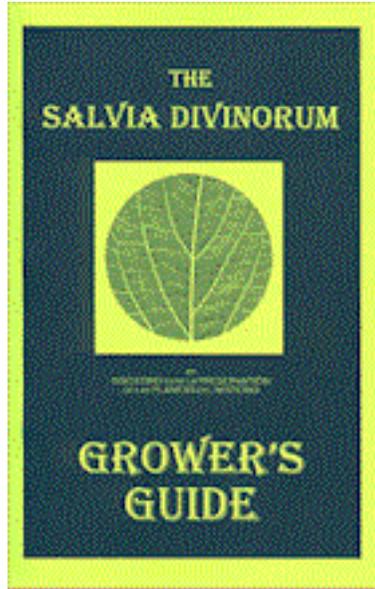


# The Salvia Divinorum Grower's Guide



*by*  
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Salvia divinorum  
(aka "diviner's sage")  
is an  
extremely rare  
plant used by the  
Mazatec Indians in  
medico-magico-divinatory  
ceremonies.

This comprehensive guide  
explains how  
anyone can cultivate  
this most mysterious of  
power plants.

*spectral mindustries*

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*Few have heard of it.  
Fewer know what it looks like.  
Fewer still have ever met the sagely ally,  
yet the alliance forms invisible links  
wherever it goes...*

---Dale Pendell  
*Pharmako/Poeia*

*....welcome fellow friend of mystery plants!*

There are almost 1000 species in the genus *Salvia*, But none quite like the “sage of seers”, *Salvia divinorum*. As its English colloquial names suggest (“diviner’s sage” and “sage of seers”), *Salvia divinorum* is linked to the human mind in a most mysterious way. Your authors have been blessed to have a growing relationship with this exotic friend, and it is our wish that you too will catch and fan the sparks of joy cast out by this “hidden pearl”.

## **Entering the Uroboros**

*Salvia divinorum* is a very rare plant known only to the Mazatec Indians of Mexico until the latter half of this century. Rumors of the plant, said to be used in medico-magico-divinatory ceremonies, filtered into the minds of North American anthropologists and botanists beginning in the late 1930’s and early 1940’s. However, it was not until October 1962 that a viable specimen reached the hands of North Americans.

Having traveled by horseback in the Sierra Mazateca in search of the mysterious plant, R. Gordon Wasson and Dr. Albert Hofmann were rewarded on October 8, 1962. On that date, while in San José Tenango, an old curandera by the name of Natividad Rosa, who heard they were looking for the plant, brought them a bundle of cuttings. (Hofmann 1990).

Upon returning to the United States, Wasson and Hofmann gave one the specimens to Carl Epling, an expert in the genus *Salvia*. Epling determined that the plant was a theretofore unknown species of *Salvia*. He named it *Salvia divinorum* in light of its ritual use by the Mazatec for divination (Epling & Játiva 1962).

Among the many mysteries of *Salvia divinorum* is that it very rarely sets seed. You will not find *S. divinorum* seeds for sale anywhere. For all practical purposes, therefore we agree with our friend Dale Pendell: "...if you want *Salvia divinorum*, you will have to get it the same way everyone else has for the last two thousand years: from a cutting from someone who grows it" (Pendell 1995). Acquiring such a cutting is your initiation into a unique mystic matrix.

Most likely, any cutting you obtain will be a clone of the very plant that Natividad Rosa gave R. Gordon Wasson and Dr. Albert Hofmann in 1962. Cuttings from this very plant have been distributed worldwide, and are known today as "Wasson clones". Like all cuttings, they are genetically identical to the mother plant.

While other researchers have since returned to the U.S. with cuttings of *S. divinorum* collected in various regions of the Sierra Mazateca, most of these strains have not received wide distribution.

In 1991, anthropologist Bret Blosser collected two specimens of *S. divinorum* near Municipio de San José Tenango, Mexico. Cuttings from the plant material obtained by Blosser have been widely distributed and are known as the "palatable clone" because when Mr. Blosser ingested it in the Sierra Mazateca it was markedly less bitter than leaves from locally grown "Wasson clones".

We notice very little difference in bitterness (and no difference in potency) between foliage from the Wasson clone and the so-called palatable clone, nor do we see any morphological distinctions. We, however, have not tasted foliage from plants grown in the Sierra Mazateca.

Mr. Blosser has suggested that perhaps soil or other cultivation factors may be responsible for the taste differences, rather than genetics (Blosser 1998). Given that *S. divinorum* has never been observed to set seed in the wild (in fact, even in the Sierra Mazateca it is only known to exist in areas touched by humans), and that broken or drooping stems copiously root where they touch the ground, we speculate that the Wasson clone and the palatable clone are from the same germplasm.

## Starting from an Unrooted Cutting

Unlike most plants which have relatively round stems, the stems of *Salvia divinorum* are square. Also, unlike most plants, the stems of *Salvia divinorum* are hollow in the center. A freshly made cutting, therefore, when viewed on end, shows the ageless mystery symbol of the circle within a square. The circle inscribed in a square is an ancient Cabalist symbol for the spark of divinity residing within the material. A circle has long represented the divine and everlasting, while the square has symbolized the terrestrial and finite.

The first thing to do upon obtaining a cutting of *S. divinorum* is to correctly orient it top to bottom. If the cutting is a tip-cutting, or if there are side shoots or leaves, the orientation is self-evident, as the shoots and leaves reach upward. However, because *S. divinorum* is a very sensitive plant, it is not uncommon for a cutting to drop its leaves or side shoots. Additionally, it is possible that your cutting will be a mid-stem cutting, without a growing tip to aid correct orientation.

One technique that dispenses of the need to determine the orientation of a mid-stem cutting, has been employed by Daniel Siebert, the first person to experience the effects of isolated salvinorin A, the active principle in the plant.

Simply take a mid-stem cutting that contains at least one node and remove all large leaves. Lay the stem cutting horizontally on wet, rich soil and place in a humidity chamber (see next section). The stem will root all along its length and send up two new shoots at each node (Siebert 1998).

If you are not using the above technique, it is necessary to determine which end of the cutting is up. Fortunately,

so long as you realize that this is an issue, determining the cutting's correct orientation is a simple process of observation.

Examine the nodes (i.e., those places where the otherwise smooth stem becomes bulbous, and from which leaves and side shoots will later grow). When properly oriented, the stem segment above any given node is usually, but not always, of slightly less circumference than the stem segment below a node. In other words, the stem segments usually become more slender toward the top of the plant. Also, careful examination of any given node should reveal upward tilting leaf scars or "shoulders" from which new shoots grow.

Once you have determined the cutting's correct orientation, the next step is to prepare it for rooting.

### **Constructing a Rooting Chamber**

Rooting and growing *Salvia divinorum* is made much easier if you create a high humidity environment. Therefore, unless you live in a naturally humid environment, we strongly recommend the preparation of a humidity chamber to house the fragile cutting while it produces roots.

We've rooted hundreds of *S. divinorum* cuttings in secondhand ten gallon aquariums. To turn an aquarium into a humidity chamber, simply measure the top of the aquarium and have your local hardware store cut a piece of glass that snugly fits the top give the aquarium a good washing using a clean scrub pad and vinegar. Be especially careful to remove any old algae or fungus-like deposits remaining affixed to the glass from the days when the aquarium may have been a home to fish. Glue or tape a small piece of wood to the glass top to serve as a handle.

With the glass top closed, and daily misting from a hand-held squirt bottle filled with room temperature purified drinking water, your humidity chamber will provide a perfect environment for fragile young cuttings.

### **Rooting in Water**

Rooting in water is the most common and effective method of rooting a *Salvia divinorum* cutting. If you follow

the following steps it is practically fail-safe.

Obtain a bottle, vase, or other tall thin water-holding container. *Salvia divinorum* roots copiously all along the stem, not just at leaf nodes. Ideally, your rooting vase should be approximately 2/3 the length of your cutting.

We strongly recommend you give each cutting its own rooting vase. This way, any stem rot that occurs will remain isolated. One grower we know utilizes sterilized beer bottles (Hanna 1998). Kept in their cardboard six-pack holder, they are space efficient rooting vases and can be easily moved six at a time. Cuttings that have leaves or side shoots will rest on the narrow neck of the bottle such that the submerged rooting area of the stem is entirely suspended.

If you use beer bottles as rooting vases, two things must be kept in mind. First, make sure you thoroughly clean the bottles, as even the slightest remnant of beer will greatly increase the possibility of stem rot. Second, the relatively small volume of water that can be held in a beer bottle, combined with the fact that most beer bottles are darkly tinted, increases the risk that the water level in a bottle could become insufficient and go unnoticed. This risk is especially great if the bottles are being kept in their six-pack holders, Therefore take care to occasionally examine the water levels and top-up those bottles that appear low.

Fill your rooting vase with room temperature purified drinking water. (Do this before placing the cutting in the vase to prevent accidentally pouring water inside the hollow stem and thereby increasing the chance of stem rot.)

We do not recommend using rooting compound. Not only are many rooting compounds toxic, but we have not found them necessary. If you do use a rooting compound, we suggest Olivia's Cloning Gel®, a balanced blend of rooting agent and fertilizer in a viscous water soluble gel base that seals the cutting and may help protect against infection.

An old gardener's trick is to put a cutting of pussy willow (*Salix discolor*) or corkscrew willow (*Salix matsudana*) in the water with other cuttings you are seeking to root.

Willows are strong producers of auxin, a water soluble growth hormone. (Willow branches set in water will

actually begin visible root formation in less than two days.) Because auxin is water soluble it flows out of the cut willow stems and is taken up by the *S. divinorum* cuttings, thereby prompting root formation. You can get fresh cut branches of pussy willow and corkscrew willow at almost any florist. The downside to using a willow cutting is that you may unwittingly introduce pathogens into the water.

Some growers wash their cuttings in an antifungal to reduce the risk of stem rot. We have not found this necessary as long as only purified drinking water is the rooting liquid and the rooting vase is thoroughly clean. An alternative to commercial fungicides is a mixture of 1 tablespoon bleach to 1 gallon water.

If your cutting was not just removed from the mother plant, take a very sharp blade and re-cut the bottom, approximately 6mm (.25in) below the lowest node. Make sure you have the cutting properly oriented before you make the cut. Immediately after making the fresh cut, carefully lower the cutting into the prepared water-filled rooting vase. At least one node should be above the water line and at least one below.

Immediately place the vase into the waiting humidity chamber and give the cutting a series of squirts from a hand mister.

## **Waiting for Roots to Form**

Your cutting should now spend all its time inside the humidity chamber. It's optimum if you can keep the inside temperature of the chamber at around 21°C (70° F). The chamber should be well-lit, but not in direct sun.

The humidity inside the chamber should approach 100 percent. This is easy to achieve by occasionally opening the top of the chamber and misting the inside with room temperature purified drinking water. You can combat stress and promote quicker rooting, by foliar feeding once a day. To do this, fill another misting bottle with 1/4 strength Stern's Miracle Gro® or Earth Juice® along with two tablespoons seaweed extract per gallon. Each time you mist or foliar feed, fan the air in the chamber a bit before you spray to provide some beneficial air circulation.

In our experience, if you follow these procedures and keep the chamber in indirect sunlight or under bright

fluorescent lights (dark at night is fine), the cutting should produce roots in two to three weeks. You may even begin to see new leaf and side shoot growth.

The first sign of roots will be tiny pin-prick-size white pimples that will appear on the stem. A few days after these appear, they will begin to lengthen, quickly becoming delicate thin roots. In the humidity chamber, with daily spray bottle misting, it is not uncommon for these roots to form above the waterline and reach out into the humid air, looking like neuronal dendrites.

When the roots are approximately 2.5 cm (1 in) long it's time to plant the cutting in soil. Letting the roots grow any longer seems to make them more susceptible to shock and increases the opportunity for stem rot.

## **Planting in Soil**

Once your cutting has rooted in water, the next step is to plant it in its first soil pot. Obtain a pot that is tall enough to allow soil to cover all the newly-formed roots. The pot must have sufficient drainage holes. Several holes around the periphery of the base allow better drainage than one single hole in the center.

Healthy *S. divinorum* can produce a large root mass quickly. We recommend you start your cutting in no smaller than a one gallon pot to avoid having to re-pot too soon. We routinely start ours in fifteen gallon pots (and larger) and thereby avoid re-potting altogether.

For *S. divinorum* we only use plastic pots, not terra-cotta. In our experience, terra-cotta pots allow too much side evaporation to occur. The soil in plastic pots dries out slower and forces the water to evaporate off the soil surface, thereby exposing the underside of the plant to a very fine upward-rising mist. Just be sure you don't over-water as plastic pots are more conducive to root rot than terra-cotta pots.

Once you have mixed your soil (see page ), fill the bottom of your pot with your mixture. Then, carefully rest the base of your cutting on this soil as you sprinkle handfuls of your soil mixture around the stem, being very careful not to tear the fine root hairs.

Loosely pack soil around the cutting until all the roots are covered and at least one leaf node protrudes from the soil. The soil should be firm but not compressed too tightly.

Once in soil, give the plant a slow but thorough watering with room temperature fish emulsion solution mixed at 1/2 the manufacturer's recommendation (using purified water is no longer necessary). Immediately, place the potted plant back into the humidity chamber or into a humidity tent (see next section).

## **Constructing a Humidity Tent**

The humidity chamber, described earlier, is a great aid for rooting cuttings. But, it is too small and, being made of glass, too fragile to host potted plants. Therefore, we strongly suggest that before you pot your young cutting you prepare a larger humidity-controlled environment, which we call a humidity "tent".

Small humidity tents approximately 90 cm (3ft) tall, made of plastic, and looking somewhat like fully enclosed oblong umbrellas with bottoms, can be found advertised in the back of gardening magazines or at specialty gardening stores. These tents work well for young *S. divinorum* plants. The humidity can be controlled by a small ultrasonic humidifier set on a timer, or by simply squirting inside the tent with a hand mister a few times each day. It will not take long, however, for your plant to outgrow such a small tent.

A very good humidity-controlled environment, capable of housing a dozen or so mature *S. divinorum* plants, can be made for about \$140 by utilizing an off-the-shelf "screen tent" available in the sporting goods department of K-Mart, Target, or similar stores. The tents are sold as shade or mosquito tents to protect picnickers, and feature fabric tops and fully-screened side walls.

The best tent for our purposes has no bottom, but is otherwise fully enclosed with screen and has quality tall zipper entrances. The screen allows in filtered sunlight, and helps contain humidity, while still allowing plenty of air circulation. Another beneficial insects released inside it stay around much longer than if released in an open environment.

The grower who devised this system lives in an arid climate that regularly reaches above 35° C (95° F) in the summer. He purchased a screen tent for about \$120 at Target and rigged it with a rudimentary Raindrip® watering system fitted with five misting nozzles (part No. R163C ) suspended from the inside top and sides. Turning on the water a few times a day for a few minutes (this can be set on a timer), creates a perfect environment in which *S. divinorum* thrives (Boire 1997).

Everyone who has seen our full-size humidity tent (outfitted as above), has marveled at the ideal *S. divinorum* environment. The leaves of our plants average 18 cm (7in) in length and occasionally reach 25 cm (10 in). If you live in an excessively arid, hot, sunny or windy location, we strongly recommend that you utilize such a tent. It is not only useful for growing *S. divinorum*, but numerous other plants with a shamanic history.

In the winter months, the humidity tent is easily covered (for about \$10.00) with plastic sheeting. In places with a mild winter, this creates an inexpensive, but functional greenhouse in which your plants can survive the winter. Come spring, cut larger and larger “windows” in the plastic sheeting to modulate the relative humidity and inside temperature over a several week period until you have removed all the plastic covering.

## **Growing Outside a Humidity Tent**

Despite what many people believe, it is possible to grow *Salvia divinorum* outside a humidity-controlled environment, it just takes some care and attention. Many growers have given up on this after removing a plant from a humidity-controlled environment and finding it completely wilted only an hour later.

The trick to growing *S. divinorum* in a non-humidity-controlled environment is careful “hardening off”. Growing *S. divinorum* in a humidity-controlled environment makes the plants “soft” and less able to cope with environmental changes, but if you help them adjust they are able to do so.

Never remove a *S. divinorum* plant from a humidity-controlled environment and leave it out in the open air all at once. You must incrementally give the plant more and more exposure to dry air, wind and sunlight. the best technique is the following.

Water your plant thoroughly, remove it from the humidity tent, and set it in a shady, wind-protected spot. Give the plant a hand misting. Set a timer to alert you when one hour has passed. When the timer rings, return the plant to its controlled environment. Each day, remove the plant for an additional hour, so that by the end of two weeks it is spending all day outdoors. Pay attention to how the sun moves to ensure that a plant placed in morning shade does not receive direct afternoon sunlight.

Once the plant is acclimated, it should be given a permanent home in a wind protected location that receives filtered sunlight. Consider installing a drip watering system with misting nozzles for ease of care.

## Optimum Growing Parameters

### Soil

*Salvia divinorum* does best in loose rich potting soil/or leaf mold, with good drainage. We do not use perlite or vermiculite, but many other successful growers do. We avoid soil that contains any redwood or cedar chips. Our best results have been obtained by using slightly aged (i.e., brown) grass clippings and a little aged steer manure, mixed with good, rich, dark potting soil, compost and coarse sand.

Soils in tropical environments like the Sierra Mazateca typically contain a great amount of organic material. The natural breakdown of this organic material produces a pH that is slightly acidic and also aerates the soil. We have found that *S. divinorum* does well by duplicating these soil conditions.

The soil mixture we use is:

- ◆ 1 part aged grass cuttings
- ◆ 1 part compost
- ◆ 1 part coarse sand
- ◆ 1/2 part aged steer manure
- ◆ 3 parts rich soil

Another successful grower we know (Chomicz 1998) uses the following soil mix with great success:

- ◆ 2 five-gallon buckets coconut “coir” fiber (or substitute black peat)
- ◆ 1 bucket coarse sand
- ◆ 1 bucket vermiculite
- ◆ 1 bucket perlite
- ◆ 1 bucket rich soil
- ◆ 1 bucket compost
- ◆ 6 cups of an equal blend of organic nutrients: colloidal phosphate, greensand and bloodmeal
- ◆ 1/4 cup ground limestone (double if using peat)

Leander Valdés, who studied *S. divinorum* at the University of Michigan, used the following mixture:

- ◆ 4 parts soil
- ◆ 2 parts peat moss
- ◆ 1 part vermiculite
- ◆ 1 part perlite

You may wish to experiment with these formulas. If you are concerned that your soil may be too dense or clay-like, try adding some styrofoam packing “noodles” used to protect fragile items. Break them up with a hand trowel and thoroughly mix them into your soil. They are completely inert and work well at lightening soil (and, mixing them into soil provokes an interesting mediation on modernity).

Regardless of what soil mixture you use, try to keep your soil pH between 6.1 and 6.6. We’re able to achieve this by watering approximately once a month with Stern’s Miracid® or with a solution of 1 tablespoon of 50-grain (5-percent) natural apple cider vinegar to one gallon of water.

If your soil is too alkaline (above 7.0) you can make it more acidic by mixing in small amount of powdered sulfur or chelated iron. If your soil is way too acidic, add ground limestone or crushed oyster shells to increase the

alkalinity.

## Temperature

In its “natural” environment of the Sierra Mazateca, the highest temperature is about 26° C (78° F), and more typically ranges between 16-21° C (60-70° F). *Salvia divinorum* does best in a relatively cool and mild climate. Above 29° C (85° F), any plant that isn't well acclimated, or inside a humidity tent, will show signs of wilting. If your plant is properly acclimated and/or inside a humidity tent, it should withstand warm days without any harm. On very hot days, simply leave the misters on longer.

If the temperature drops below freezing, *S. divinorum* will quickly die, wilting and turning a horrifying black overnight. Therefore, if you live in a cold location you will need to move your *S. divinorum* plants indoors or into a heated greenhouse during the severest winter months.

We have not discovered any way to resuscitate a frozen plant. The best you can do, should one of your plants fall victim to unexpected cold temperatures, is to cut it back to about 26 cm (10in) above the soil level, and hope that the rootball survives. Come warmer temperatures, the plant might recover----but many don't. (Plants that *do* grow back after a freeze often grow prolifically because of the well-developed rootmass.)

Most growers who move their plants indoors during the winter, perform their major leaf harvest in late summer. This garners a substantial amount of foliage while also making it much easier to move the otherwise lanky plants with less risk of damage. Cut the plants back to about 26 cm (10in) above the soil level. They will heal and grow just a bit during the fall. As temperatures grow colder move them inside under artificial lights or into a heated greenhouse.

Another winter option is to force your plants into dormancy by cutting them back and moving them to a fairly well-lit but cool shelter----no colder than 4° C (40° F). With little or no leaves on them, the plants require watering only about once every six weeks (no misting is required) and can withstand at least four months of such conditions without harm (Beifuss 1998). This is a good technique for those who wish a vacation from tending their

plants yearround.

## Misting, Watering & Feeding

Even well-established *Salvia divinorum* plants do best with regular misting. If you only have a few plants, this can be done with a hand spray bottle, filled with room temperature purified water.

Water quality can markedly affect *S. divinorum*. You might consider experimenting with collected rainwater, unless you live in an area affected by acid rain. (Check the pH of collected rainwater before using it.)

Avoid tap water that is excessively hard (i.e., above 150 ppm hardness), or water with sodium levels above 50 ppm (a level which some municipal water can exceed even without softening). Water above these levels has a deleterious effect upon *S. divinorum*.

If you have several plants, we recommend that you purchase a pump-type spray bottle. These bottles hold about two liters of water and have a pump that protrudes from the cap. After pumping them up, they emit a fine spray just by squeezing the trigger. These bottles can be purchased at K-Mart for about \$10.00.

If your plants are grown outdoors or in a humidity tent, we strongly recommend that you set up a drip watering system that utilizes misting nozzles. (The Raindrip® misting nozzle mentioned earlier delivers 3 gallons per hour.) This is certainly the most efficient way to mist your plants. You can set such a system on a timer to turn on for five minutes several times per day, or you can turn the water on by hand.

Regular misting keeps the soil damp on top, but don't make the mistake of thinking that regular watering is not also required.

We water our *S. divinorum* every 7 to 10 days with a fish emulsion mixture, according to directions on the bottle. We use Alaska® "fish fertilizer", which is 5-1-1.

There are some drawbacks to using fish emulsion. As you would expect, fish emulsion stinks, and you should seriously consider this before watering indoor plants with it. Even for outdoor plants, the fishy odor is strong enough to call out to roaming cats, dogs, possums or other animals. Therefore, if you feed your plants with fish emulsion *be sure* they are in a protected location where curious animals cannot get to them! Also, more than powdered fertilizers, fish emulsion seems to attract insect pests. All things considered, it is still our choice of fertilizer.

Every third watering or so, rather than use fish emulsion we use Stern's Miracid® a 30-10-10 fertilizer that contains chelated iron, magnesium and zinc. This helps keep our soil slightly acidic.

We water about one-third as often in the winter months, but mist just as frequently.

In his experiments at the University of Michigan, Valdés fertilized his plants once per week with Stern's Miracle Gro® a 15-30-15 fertilizer. To increase the acidity of the solution he added 1 ml of an 85% phosphoric acid solution per 5 gallons of water (Valdés 1987).

The soil should never be allowed to become bone dry. By watering once every 7 to 10 days, and misting every day, our soil cycles from very wet immediately after watering, to almost dry on the day before the next watering. Allowing the soil moisture to cycle in this way encourages aeration and guards against root rot.

## Light

*Salvia divinorum* does best in filtered sunlight. Conventional wisdom is to avoid all direct sunlight and such advice is, by and large, good advice. We have found, however, that once acclimated, *S. divinorum* does fine with some direct sunlight each day. A plant that gets too much direct sunlight will start to develop smaller deformed and coarse leaves.

Once they have been potted into soil, we grow all our plants in natural sunlight. The single best supplement to natural light is a high pressure sodium (HPS) lamp. An HPS lamp is more efficient than an equivalent watt metal halide lamp and its spectrum of light is more conducive to the rooting of new cuttings. As a supplement to natural

light, a 400 watt HPS lamp will illuminate a primary growing area of just under 2 square meters (about 6 ft x 6 ft). For growers with three or fewer plants, a 250 watt HPS lamp should suffice.

Plants grown exclusively under a sodium lamp, however, will be slightly leggier than plants grown under a metal halide lamp. Therefore, if you are growing *S. divinorum* without any natural light and want to maximize vegetative growth, a metal halide lamp is your best choice (Chomicz 1998).

Valdés reported that his plants did well under cool white VHO fluorescent lights (Valdés *et al.* 1987). Another grower has successfully used a 400 watt metal halide lamp to illuminate a 2.5 square meter (about 8 ft x 8 ft) growing space (Beifuss 1997). He reports that the leaves lighten in color, but this does not seem to harm the plants nor affect their potency.

When using a high-watt lamp (HPS or metal halide), keep the lamp at least two feet above the plants to avoid burning them. A reddish blush to the leaves indicates that the light is still too close to the plant tops. Because high-watt lamps emit a dry heat, extra misting may be necessary. Before doing this, however, shield the lamp from water droplets. Hot lamps can explode if water hits them!

Under artificial light, *S. divinorum* foliage is maximized with eighteen hours of light per day. To produce flowers, natural or artificial light must be reduced to no more than 11 hours per day.

## Hydroponic Cultivation

*Salvia divinorum* can be grown hydroponically. A basic hydroponic setup utilizes a special growing medium in place of soil, and a rudimentary drip system driven by a low wattage aquarium pump that trickles a stream of nutrient solution through the growing medium. The solution is recaptured in a reservoir, oxygenated by a second aquarium pump fitted with a bubbler, and re-circulated.

Although hydroponic cultivation requires extra attentiveness by the grower, at least one very successful cultivator, Mr. Andrew Chomicz, reports that the additional care is rewarded with excellent results. The following sections are

derived from his extensive exploration of *S. divinorum* hydroponic cultivation techniques (Chomicz 1998).

## Growing Medium

*Salvia divinorum* does well in a 75/25 mix of expanded clay pebbles and coconut fiber (aka "coconut coir"). Expanded clay pebbles manufactured specifically for hydroponic growing (and sold under brand names such as HydroRock™ and Growrox™ ) offer superior oxygenation to rockwool, and are far more environmentally friendly than rockwool slabs.

Coconut fiber is a recent breakthrough in hydroponic cultivation----a welcome alternative to materials like peat (which is often ravenously scoured from sensitive peat bogs). Coconut fibers are a completely natural product recovered from the waste stream of commercial coconut processing. The fibers are excellent at holding oxygen as well as water, thereby improving aeration. They also help stabilize pH and buffer against nutrient fluctuations and temporary equipment malfunctions. Coconut fiber even seems to discourage some plant pathogens.

Mr. Chomicz has experimented with water culture----a system that entirely dispenses with a solid growing medium. In water culture the roots of the plants are suspended or floated in a bath of constantly re-circulating and oxygenated liquid nutrient.

A similar technique, known as "nutrient film technique" (NFT) employs channels, tubes or gutters, in which the plants hang, and through which a thin film of nutrient solution constantly circulates.

An even more minimalist technique, called "aeroponics", constantly mists the roots with nutrient solution. Because aeroponics provides a highly-oxygenated solution, *S. divinorum* grown aeroponically is said to do remarkably well. The major drawback, however, is that an aeroponic system must function flawlessly. The slightest glitch (e.g., an interruption of power or a clogged mister) spells disaster; for without any growing medium to retain water, the roots quickly dry out and suffer potentially irreparable damage.

## Nutrient Management

There are numerous brands of fertilizer that are manufactured expressly for hydroponic systems. No particular brand or formulation stands out as best for *Salvia divinorum*. Because *S. divinorum* seems to appreciate mineral-rich media, look for a formula which contains micro nutrients in addition to the usual profile of macro nutrients.

Use a formula intended for vegetative growth and follow the manufacturer's directions to mix the solution. If the manufacturer gives different mixing ratios for specific crops, good results will be obtained by following the ratio used for growing lettuce or other leafy crops. If you have an EC meter (an instrument that measures electro-conductivity---a function of the concentration of dissolved fertilizer salts in the nutrient solution) aim for an EC level of between 1.6 and 2.4.

It is very important that you change your nutrient solution regularly. When plants are actively growing, this means a complete change of solution every four to six weeks.

Although the nutrient solution is re-captured in a reservoir and re-circulated, the amount of liquid in circulation will slowly decrease due to evaporation and plant respiration. Top-up the reservoir with a 1/2 strength nutrient solution. Using a 1/2 strength solution will help guard against the accumulation of excess nutrients while still replenishing those which have been depleted.

*Salvia divinorum* roots love oxygen. For this reason, it helps to oxygenate the nutrient solution when it is re-captured in the reservoir. This is easily done by employing a second aquarium pump fitted with a bubbler placed in the reservoir.

You can also take advantage of the fact that oxygen is more soluble in cool water. Generally speaking, the colder the water, the higher the content of oxygen. Simply by keeping your nutrient solution cool, you will increase the oxygen content of the solution and significantly benefit your plants.

The optimum temperature of nutrient solution is between 18-21° C (65-70° F). Using a solution that is much warmer will stress the plants and invite serious pathogens such as the root-rotting fungus *pythium*. Therefore,

it is important to keep your nutrient reservoir out of direct sun from late spring to early fall.

In the winter months, it may be necessary to slightly heat the nutrient solution. Use an aquarium heater in the reservoir, or use a dark colored reservoir to absorb warming sunlight.

## pH

Hydroponic cultivation requires very careful attention to the pH of the nutrient solution. For the clay pebbles/coconut fiber medium, a pH of between 5.5 and 6.0 is optimum. For rockwool, a more alkaline solution of between 6.0 and 6.3 seems best in order to protect against an acidic breakdown of the rockwool's mineral structure.

Inexpensive pH test strips are the best way to monitor the pH of the solution, unless you invest in an expensive pH pen or meter. (Low-priced pH meters are notoriously inaccurate and unreliable.)

Phosphoric acid can be used to lower pH, while adding potassium hydroxide will raise pH. The pH of the solution should be tested at least every three days, and immediately adjusted as required.

## Pests

There are a number of insects that commonly feast on *Salvia divinorum* and, which if not controlled, can severely stress the plant, or in extreme cases prove fatal. We avoid all non-organic pesticides and strongly recommend that you do the same. All the common pests of *S. divinorum* are relatively easy to control, and an attentive gardener should notice their appearance before any infestation becomes critical. Each of the common pests will be discussed below with specific control tips.

In addition to the control tactics discussed below for each particular pest, we have had great success controlling aphids and whiteflies by spraying the following solution on the infested leaves whenever we notice the pests. The solution does not harm *S. divinorum* and is non-toxic:

- ◆ 4 parts water
- ◆ 1 part rubbing alcohol
- ◆ 1 part liquid castile soap

If your plants ever become infested with whiteflies eggs, try washing them off with pure liquid castile soap. This is a labor of love. Dab your hands in a bowl of the liquid soap and gently rub infested leaves between your thumb and fingers, thereby dislodging the eggs. Spray off the soap with a misting bottle. Don't worry about the soapy runoff or residue left on the leaves. It is harmless.

In extreme cases of infestation, pyrethrin (aka pyrethrum) may be called for. Pyrethrin is a natural product extracted from *Chrysanthemum* flowers. (Synthetic versions are called pyrethroids.) Pyrethrin is an insect nerve poison and is commonly used to control pests on fruits and vegetables. It kills insects rather indiscriminately, however, dealing a death blow to beneficial insects such as ladybugs.

Pyrethrin is the active ingredient in many commercial products marketed as safe for use on fruits and vegetables. While it is organic and commonly used on food crops, in an abundance of caution, we recommend using it only as a last resort. It is moderately toxic to mammals and can trigger hay fever in some people. Also, in an abundance of caution, we recommend avoiding any product that contains piperonyl butoxide (BTO), a synergistic additive that boosts the effectiveness of pyrethrin, but which may detrimentally affect the human nervous system.

## Whiteflies

Whiteflies (*Trialeurodes vaporariorum*) parasitize *Salvia divinorum*, and if not controlled can significantly weaken a plant. You probably won't notice them until you brush against a leaf and suddenly notice flying white dots about 1 mm (.04in) in size.

Whiteflies congregate on the underside of leaves and lay eggs. They harm the plant by sucking its sap and by producing a honeydew-like excreta that can become moldy.

To control whiteflies (and to a lesser extent, aphids) we exploit their natural attraction to yellow. A company named SureFire® makes a nontoxic sticky-surfaced yellow cardboard trap that works well. The pests are attracted to the yellow colored cards, but stick to the surface upon landing. We have these hanging year round near all our *S. divinorum*.

New research from the University of California indicates that placing tinfoil on the ground around plants susceptible to whiteflies confuses the pests, perhaps reflecting the sky and making them "think" they are on the wrong side of the leaf. In any event, the trick is said to keep whiteflies from landing. This information is new to us and we are just now beginning a trial run in our gardens.

If your plants are growing in a closed environment such as a humidity tent or mini-greenhouse, *Encarsia formosa* wasps are very effective at controlling whitefly infestations. (This species of wasp is very small and will not sting humans.) The wasps lay their eggs inside developing whitefly pupa, killing them. Biocontrol with *E. formosa*, however, works best in the hot summer months.

## Spider mites

Spider mites (Tetranychidae spp.) can be a problem for *Salvia divinorum*, especially when plants are grown in a greenhouse or humidity tent.

Spider mites are usually first spotted when they cause small yellow spots on the top surface of the leaves or (in serious infestation) spin a web around the growing tips of the plants and turn the leaves brown. When you inspect the underside of a leaf you will see yellow, tan or greenish pinhead-sized bugs with dark spots on each shoulder.

An effective biocontrol for spider mites is *Phytoseiulus persimilis*---insects that devour spider mites with a vengeance. These carnivorous predators will not eat *S. divinorum* or other plants.

## Aphids

The telltale sign of aphids (Aphididae spp.) on *Salvia divinorum* is curled and puckered young tender leaves. Upon inspection you'll see small, soft bodied, (usually) green bugs clustered on the growing tips and the underside of leaves. Aphids carry plant diseases and, like whiteflies, weaken *S. divinorum* plants by sucking out leaf juices and by excreting a honeydew feces that attracts mold.

We have had great success controlling aphids with the soapy-alcohol solution described earlier. If you're a fan of ladybugs (*Hippodamia convergens*), or really need to control a serious aphid invasion, introducing ladybugs almost always takes care of the problem and causes no harm to *S. divinorum*. As with other biocontrols, ladybugs work best in enclosed environments such as a humidity tent or greenhouse.

## Scale

Although we have never had an attack of these creatures, we have heard several reports of scale (Coccidae spp.) on *S. divinorum*.

Scale are insects, but other than in their very earliest stage, they look more like very tiny clam shells stuck to the undersides of leaves. They can be any number of colors, and they damage the plant by sucking out plant juices and injecting toxic fluid into plant tissues.

We are not aware of any really effective biocontrols for scale, but fortunately they are easily dealt with by spraying them with the soapy-alcohol formula described earlier. Stubborn scale may need to be physically rubbed off, similar to removing whitefly eggs.

## Snails

Snails can quickly damage *Salvia divinorum*, chewing large holes in the leaves in a single night. Snails usually disappear during daylight hours.

Thin copper (0.5 mm/.02 in) has been used by gardeners for several decades to form a line that snails won't cross. Copper sheeting or tape sold for this purpose is available in most garden stores. Tape it around the edges of your pots or slide it around the base of your plants. Because the copper conducts an electrochemical shock into the snails, it only works as long as the copper is shiny. Buff it or replace it with new shiny copper when it becomes dull from oxidation (which usually takes at least a year).

At the same time you apply the copper barrier, carefully check the underside of every leaf, as a snail may occasionally lurk there, and once inside the copper barrier will be undeterred from eating your plants.

## Problems

### Browning Leaf Edges

Most people who grow *Salvia divinorum* will, at one time or another, have a plant with leaf tips and edges that turn brown for no apparent reason. Usually this browning remains limited to the leaf tips and edges but occasionally it can encompass complete leaves and become critical. As far as we know, no one has been able to figure out a definitive cause for this phenomenon.

Some growers have postulated that certain *S. divinorum* diseases are systemic, lying dormant until the plant is under sufficient stress to cause the emergence of the disease. The systemic disease, perhaps a virus, may have developed in *S. divinorum*'s static genotype may have allowed a leaf-browning virus to build itself into the plant---- something that might not have developed if the plant's reproduction was occurring through the normal mix of genetically varied material.

If this theory is correct, the browning phenomenon may only be preventable by keeping your plants in optimum growing conditions and uncompromised by stress. Indeed, we have noticed that the browning phenomenon almost exclusively attacks plants that are weak or under stress. Such stresses can be many.

Certainly, a plant removed from a humidity-controlled environment without proper acclimation may develop brown leaves, but more commonly the entire plant wilts and leaves drop off. The browning phenomenon is usually not accompanied by wilt.

We've seen the browning phenomenon most commonly on plants that have spent their entire life inside glass or plastic humidity chambers/tents. In such cases, we suspect the browning may be the result of poor air circulation. A plant grown in a stagnant environment that reaches 32° C (90° F) may develop browning leaves----perhaps because the plant's ability to transpire is reduced. Similar to our own body's tendency to overheat in a hot humid stagnant environment, the plant may overheat for inability to efficiently transpire.

Lack of fertilizer, or too much fertilizer may also invite browning leaves. On many plants, brown-tipped leaves signal that the plant is receiving too much fertilizer. When combined with inadequate water, chemical salts can build up in the soil and this burns the tender edges of the leaves. The usual cure is to cut back on fertilizer and flush the soil thoroughly with water.

Brown leaves can also be the result of root rot on an over-watered plant with poor drainage or heavy soil. If root rot is the problem, try re-potting the plant into light well-draining soil and withholding water for a while.

Finally, a root-bound plant might also exhibit signs of browning leaf edges, though more commonly bound roots are indicated by a significant reduction in the plant's growth rate and an overall ragged appearance.

Because, the cause of the leaf-browning phenomenon is not known, the cure remains an enigma. The old proverb that "the best cure is prevention", is certainly apropos.

## Yellow Leaves

Yellow-leafed *Salvia divinorum* usually is a signal that the plant is receiving too much water. Over watering leaches out nutrients that the plant uses to create chlorophyll----a green energy-absorbing pigment. We've seen this

in west coast *S. divinorum* left outdoors during the rainy winter season. To green up the leaves, reduce water and feed the plant some chelated iron (powder or liquid form) according to the directions on the bottle. Feeding with Stern's Miracid®, which contains chelated iron and other nutrients, will usually do the trick.

### Slow Growth & Ragged Appearance

Under optimum conditions, *Salvia divinorum* grows fast, sometimes over a foot a month in the summer. It can quickly become root-bound in a small pot. Therefore, as your plant starts to gain in size, you would do well to re-pot it into increasingly larger pots. If at any point your plant seems to have slowed its growth but conditions are otherwise optimum, it probably means it has become root-bound and needs re-potting to a larger pot.

### Pruning for Maximum Foliage Production

We don't mean to sound crass, but for most people, the name of the game in *Salvia divinorum* growing is to maximize the amount of foliage harvested. This requires pruning.

The best time to prune is during the spring and summer, when *S. divinorum* growing is growing fastest. To make a plant bushier, such that it will produce more leaves, use a sharp blade to cut off the growing tips of the main stalks. Make your cut just above a node. This will force the stem to bifurcate at that point in the direction of the nodal leaves.

Don't waste the precious tip-cuttings taken during pruning. They should be rooted and replanted. In fact, when you prune you should have a rooting vase at the ready.

### Harvesting Leaves

Once your *Salvia divinorum* plant is established, it should be able to withstand fairly significant leaf harvesting and actually fare better for it. Many growers regularly remove leaves from their plants, picking them as leaves begin to

crowd others, reach their maximum size or start to appear deformed. This technique can keep a single user in constant supply of fresh and dried leaf.

*Salvia divinorum* is a sacred plant ally, and it is worth keeping this in mind whenever harvesting her leaves. In our experience, saying a prayer to the plant prior to taking any of her leaves and remaining mindful, sensitive and grateful while picking leaves may have an effect on the leaves' divinatory and visionary properties. It also shows due respect for another life-form---a respect clearly owed *S. divinorum*.

Our own bioassays of chewed and smoked *S. divinorum* leaves have not shown a substantial difference in potency based on the time of harvest. We do seem to notice a slight increase in potency just before the plant flowers. The conventional wisdom, however, is that potency is highest during the long hot days of summer. We suggest you conduct your own experiments for optimum harvest time.

## Drying Leaves

Fresh leaves of *Salvia divinorum* can, of course, be used for divinatory and visionary purposes. Traditionally the Mazatec used only the fresh leaves. Dried leaves, however are also active and can be stored for later use.

Properly drying the leaves is very important. All your work will be for nothing if the harvested leaves rot, mold or are subjected to conditions that change the natural chemical constituents locked within. Fortunately, the active principle, salvinin A, is very stable and can withstand a certain degree of rough handling. Nevertheless, it is important to preserve the leaves such that they undergo the least amount of chemical change possible. Ultimately, you simply want to remove all the water content, but leave everything else unchanged. This can be achieved quickly by placing the leaves in an oven at the lowest possible setting---below 93° C (200° F)---which dries them within 15 minutes.

There are several techniques for slow drying harvested leaves. One technique is to place harvested leaves in a cardboard box and place this box in a shady location with good air circulation. It is best to do this on a day when the temperature is between 26-38° C (80-100° F). Shake the box several times a day to expose new surface area to

the air. You may need to bring the box inside at night if dew appears likely. The leaves should be dry in a few days.

Another technique is to lay the leaves between window screens and set a low wattage fan to blow a constant stream of air over/through the screens. A final technique is to use a food dehydrator set to the medium temperature setting, about 63° C (145° F). Leaves placed in a food dehydrator usually are fully dried within three hours and retain much of their green color.

Under any method, the leaves are dry when they are crisp and crumble easily. They should then be placed in airtight glass jars and kept in a cool, dry, dark location. On average, the leaves contain just over 80 percent water, so that one ounce (about 28 grams) of fresh leaves dries to between five and six grams of dried leaves.

The stems and roots of *S. divinorum* contain only low amounts of salvinorin A, if any. They are not worth processing for visionary use.

## **Producing Seed**

When Wasson and Hofmann received the type specimens of *Salvia divinorum* from Natividad Rosa in early October, many of the plants were in flower. When fully developed, the flowers (corolas) of *S. divinorum* are white with violet calyxes and stems. (As others have since pointed out, early paintings and descriptions of the flowers mistakenly denote them as blue.)

The aroma of *S. divinorum* flowers is subtle but exquisite. Aaron Reisfield, a botanist who has made numerous visits to the Sierra Mazateca to research *S. divinorum*, has reported seeing *S. divinorum* in flower from October through May (Reisfield 1993). Valdés has seen them in flower from late August to March in the Sierra Mazateca, a period of time when the days are short in Mexico (Valdés *et al.* 1987).

Valdés' experiments at the University of Michigan showed that the plant can be induced to flower by shortening the photoperiod to provide eleven hours of light per 24 hours (Valdés *et al.* 1987). Introducing any light during the "dark period" will prevent flowering. Because *S. divinorum* is usually grown for leaf harvest and not for flowers, the latter fact can be used to prevent flowering, which if permitted (assuming you are not trying to set seed) will uselessly misdirect the plant's energy from leaf production.

On the west coast of the United States *S. divinorum* grown outdoors (but inside a humidity tent) flowers from late October through early January (Boire 1997). While it is fairly easy to get *S. divinorum* to flower, it is no easy task to get the plants to produce viable seed. As mentioned earlier, no plant has ever been observed setting seed in the wild. We believe that the plant has, in fact, chosen a different method to propagate itself, and that its rare seed production is all but vestigial.

Unless it is supported by a natural or contrived lattice, *S. divinorum*, with its hollow lanky stems, falls over when it reaches about 5-7 feet tall. The spots where the plant touches the ground take root under moist conditions. In this manner, *S. divinorum* reproduces itself and slowly creeps. And, of course, its principal program for propagation has been its union with human friends. In our opinion, trying to get *S. divinorum* to set seed is a struggle against the nature of the plant.

Nevertheless, viable seed can be produced with hand pollination. To do so, once you have a plant in flower, carefully remove some stamens from a flower and immediately brush their ends against the inside surfaces of both stigma branches. You should be able to see pollen grains adhere to the stigmas.

Experiment with pollinating the same flower with its own stamens, different flowers on the same plant, and with using stamens on one plant to pollinate stigmas on another plant. Don't be upset if you have little success. Under the best of circumstances expert botanists who have followed these procedures have achieved miserable success rates---less than five percent of successful fertilizations produce viable seed (Reisfield 1993).

## **Taking Cuttings**

Propagating *Salvia divinorum* by taking cuttings is a much easier process than forcing the plant to produce seeds. While cuttings can be taken any time of the year, we have found that cuttings taken during the fall and winter root slower. Therefore, it's best to make propagation cuttings in the spring and summer. We have also found that it is helpful to take cuttings under low ambient light to keep the leaf stoma closed and leaf turgor high.

To take a cutting for propagation purposes, prepare a rooting vase filled with room temperature purified water and place this next to the mother plant. Use sharp scissors or a blade to remove a length of stem that contains at least two leaf nodes. Vigorous new tip growth is the best, but mid-stem segment will also root.

Make your cutting just below a leaf node. Remove all leaves below the uppermost node and then immediately place the cutting in the waiting vase. Then, return your attention to the cut stem of the mother plant. Cut it back to just above the highest remaining node.

## **Tail-to-Mouth**

We hope we have inspired you to step inside the mystical circle of *Salvia divinorum*! The more time we spend with her, the more we find that she is cultivating us as much as we are cultivating her. Magic does exist. It's all around us, and growing all the time. We bid you constant curiosity, appreciation and courage!

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## **Salvia divinorum Sources and Supplies**

The Basement Shaman. Box 1165-GG, Woodstock, IL 60098. A mail-order source for live *Salvia divinorum* plants (including the "palatable clone"), growing supplies and equipment.

Native Habitat Landscaping. Box 644023-GG, Vero Beach, FL 32964-4023. [www.nativehabitat.com](http://www.nativehabitat.com). A mail-order source for live *Salvia divinorum* plants. Excellent service and prices.

Nature's Control. Box 35-GG, Medford, OR 97501. A mail-order source for predatory and parasitic insects to control pests like aphids, spider mites and whiteflies. Send 50 cents for their catalog.

## Other Good Informational Resources

The Alchemind Society, Box 73481-GG, Davis, CA 95617. [www.alchemind.org](http://www.alchemind.org). Highly recommended nonprofit cognitive liberty organization. Keeps tabs on *Salvia divinorum*'s legal status and works to promote cognitive liberty and cognitive responsibility.

*The Entheogen Review*. Box 19820, Sacramento, CA 95819. Occasionally features new information about *S. divinorum* and its active principle.

Erowid. *Salvia divinorum vault* web pages (<http://www.erowid.org/plants/salvia/salvia.shtml>).

Ott, J. 1995. "Ethnopharmacognosy and Human Pharmacology of *Salvia divinorum* and Salvinorin A" *Curare* 18:1:103-129. Mr. Ott's most thorough synthesis of information about *S. divinorum*. Includes compilation of psychonautical results.

Reisfield, A. 1998. Excellent *Salvia divinorum* web pages (<http://www.sabia.com/Salvia/index.html>) with Mr. Reisfield's *SIDA* paper and many excellent photos.

Siebert, D. 1998. *Salvia divinorum* web pages (<http://www.sagewisdom.org/>). Mr. Siebert also runs an *S. divinorum* e-mail list that can be joined via his web pages.

Turner, D. M. 1996. *Salvinorin The Psychedelic Essence of Salvia divinorum*. Panther Press, San Francisco, CA. A chronicle of the author's psychonautical experiments chewing and smiling *S. divinorum* leaves, extract and isolated salvinorin A. Since the author's full text can be found on the Internet at (<http://lavondyss.com/donut/scov.html>).

## About the Authors

The Sociedad para la Preservation de les Plantas del Misterio exists, in part, to compile and disseminate experiential cultivation information on plants with a shamanic history. We invite your correspondence on the topic and will include novel information in future printings of this book. We can be reached in care of the publisher.

THE  
SALVIA DIVINORUM



BY  
SOCIEDAD PARA LA PRESERVACIÓN  
DE LAS PLANTAS DEL MISTERIO

GROWER'S  
GUIDE

# Salvia Divinorum Grower's Guide

Salvinorin A is the most potent natural entheogen (psychedelic) yet known.

It is produced by the plant *Salvia divinorum*—used for centuries by the Mazatec Indians in medico-magico-divinatory ceremonies.

Until recently *Salvia divinorum* was cultivated by only a small circle of power plant aficionados.

But, this book explains how anyone can cultivate this magical plant.

Sources for live plants and cuttings are included.