



AFRICAN VIOLET
GROWING TIPS
From

STARTer to FINISH



Optimara® customers
please call the ***Growing Tips*** hotline
for additional information:

1-800-443-2290

Foreword

Optimara has been a leader in the African Violet business for over 60 years. We have established unmatched quality standards and plant innovations. With hundreds of varieties developed over the years, Optimara continues to advance the industry through the development of new plant characteristics, improved plant care methods and innovative growing techniques.

We are excited about the new varieties within our R&D program in the USA and in Germany. We are looking forward to what the future holds for the African Violet well into the 21st century. Our long-term vision and commitment to excellence as well as our quest for quality is a great benefit to all our customers.

The following guidelines should prove to be a very useful tool for the commercial African Violet grower. We are proud to be able to share this knowledge with you. If you have any additional questions, we will be more than happy to assist you. Please, feel free to call on us at any time!

We wish you a lot of success with the Optimara® African Violet Program.

Reinhold Holtkamp Sr., President
Holtkamp Greenhouses, Inc.



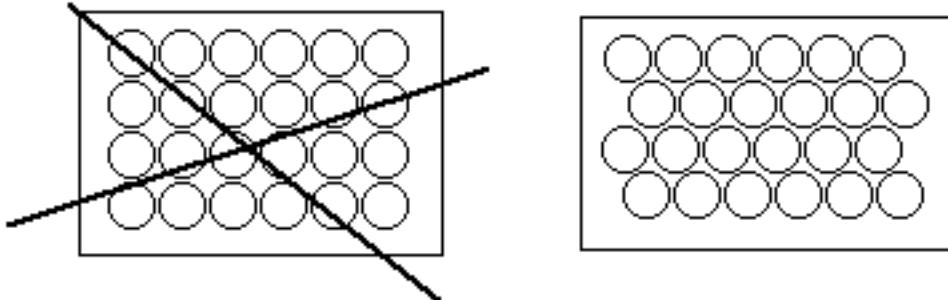
4 INCH AFRICAN VIOLETS

Potting

- **Potting Mix** -- The first and most important step in growing a good quality plant is the establishment of a good potting mix for planting the starter plant. The potting media should be a light and porous mix. We are using straight block-harvested peatmoss and are adding 20% to 25% perlite, you may use shredded styrochip beads. Depending on the acidity of your peatmoss, you have to add the proper amount of lime to balance the PH to about 5.8 to 6.2. We also include an organic fertilizer to meet the plants' immediate fertilizing needs. You may select not to include any organic fertilizer and start to liquid feed the plants immediately after potting. We do not recommend any kind of slow-release fertilizers since the plants' water requirements vary considerably during the different times of the year. Any kind of fluctuation in watering will result in over- and underfertilizing of the plants. We recommend a liquid fertilizer system. We are using a 14-12-14 NPK fertilizer with trace elements, but without urea, at a rate of 100 parts per mil.
- **Pots** -- For the normal crop, use 4" or 4 1/2" pots. If larger plants are to be grown, 5" or 6" pots are more suitable (see section on "Growing Bigger Pot Sizes").
- **Potting Procedures** -- Water dry starters thoroughly before potting them. Do not pot the starters too loosely. The growth habit of the plants will be more compact if the starters are pressed firmly into the mix. While potting make sure that the hearts of the plants are not covered with your mix, yet do not pot them too high so that the plants can develop nicely. Leaving a rim for watering will make later watering from the top easier. Water as long as possible from the top, at least until the first spacing. Place the potted plants pot to pot and water thoroughly with tempered water (see section on "Watering"). Covering the potted African Violets with a light foil or gauze will improve the microclimate on the table and accelerate the growth.

Spacing

- **First Spacing** --- Correct spacing is important. After potting the plants you should space the pot into a staggered position **pot-to-pot** of about 10 pots per square foot. The plants will remain in this spacing for about 5 to 6 weeks depending on the season.



As soon as the leaves of the individual plants start interfering with the neighboring plants by pushing up their leaves on each other -- about to 5-6 weeks into the growing period -- it is time for the first spacing. The distance between each pot should not be too big in order to maintain the microclimate on the table (approx. 6 pots per square foot). An exception to this rule are the girl varieties which from the beginning should be spaced directly for their final position (8 pots per square foot). In general, if the plants are spaced too far apart during the first spacing, the leaves will get hard and grow downwards.

- **Second Spacing** -- After 7 to 8 weeks of production, you will be required to respace the plants for a second time. The 4" pots should be spaced for their final position of about 4 pots per square foot. Skipping the second spacing may be an option provided the first spacing allowed for the additional space required. The plants may not develop properly in size and form.

Watering

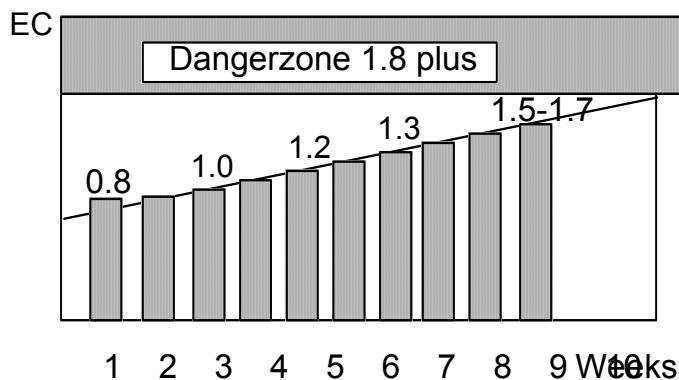
- **The Way to Water** -- African Violets should only be watered with tempered water (65 - 75°F), otherwise yellow spots may develop on the leaves. It is important to note that any fluctuation of plus or minus more than 10-12°F between the water temperature and the room temperature will cause leaf spotting. If tempered water is not available, water your crop in the early morning hours. Water from the top as long as possible to avoid salt build-up in the upper part of the pot which might appear as a result of subirrigation over an extended period of time. After the first spacing and when the first flowers appear, you should switch to subirrigation to prevent spotting on the flowers.

- **Symptoms of Overwatering** -- One can recognize an overwatered African Violet by the yellowish heart or center of the plant. If this symptom appears, refrain from watering for 10 days. Only spot-water those plants that absolutely require water. After this short dry spell, do not liquid fertilize your plants since the fertilizer will burn the roots and severely harm the plants. First apply a good drench of water, and then resume your regular schedule of watering and fertilizing.

Fertilizing

• **Liquid Fertilizing** -- Liquid fertilizing depends on the development of the crop and on the original fertilizing inside the mix. The first liquid fertilizing should take place after the first spacing or after about 5 weeks. We recommend that you use a 100% water soluble fertilizer with an NPK of 14-12-14 which does not include any urea. Our experience has proven that it is best to fertilize from then on with 100 parts per mil every other time you water .

• **Symptoms of Overfertilizing** -- When using an incorrect fertilizer, you will notice that the plants are not developing properly. The flowers will be small, deformed and pale in color. You might also detect little black spots on the edges of the underside of the leaves. If this symptom appears, you are using an inappropriate fertilizer and should select an alternate NPK source. Do not use a triple 20 fertilizer. If checking your EC the following chart allows you to check if you are within the target EC level.



Environmental Conditions

• **Temperatures** -- The optimal temperature for African Violets is around 70°F day and night. It is not advisable to lower the temperature during the night because this results in a longer growing period. Therefore, it is also not worthwhile to lower the overall greenhouse temperature since, in the end, it does not save energy.

• **Light Condition** -- African Violets need good light condition but no direct sun! The optimal light value for African Violets is around 900 - 1000 foot candle. Therefore, from February/March on, the greenhouse should be shaded according to weather conditions. As the light value increases, more shading is required. You will achieve best results by following this simple rule of thumb: Light conditions are optimal if, during full sunshine at noon, you can barely see the shade of your extended hand over the plants.

• **Shading Spray Mix** -- We suggest to use an inexpensive Latex water mix of 1 part Latex to 4 parts of water. Spray this mix in a fine mist on the roof of the greenhouse to achieve the right amount of light diffusion.

- **Inside Shading** -- For inside shading, we recommend to install a fabric with a shading of 55-65%. A double shading system is superior over a simple shading system as it provides the fine tuning for optimal light condition. The use of a double shading system might make the outside shading superfluous. Otherwise, the glass should be sprayed with additional shading color during the summer months. In order to maintain the optimum light level within your greenhouse, you will be required to remove some or all of the shading during the winter months. Shading should be monitored all year round.

6 INCH AFRICAN VIOLETS

Growing Bigger Pot Sizes

- **General** -- Violets are very popular in bigger pot sizes. One can grow a violet in a 5" or even 6" pot. In order to develop a high-quality plant and to utilize the available greenhouse space as efficiently as possible, we recommend to start your bigger pot size crop in a 4" pot. After about 8 weeks, remove all flowers and visible buds from the plant. Then transplant the violet into a bigger pot size. The 6" violet should be ready for sale in about 6 more weeks after transplanting. You should allocate about 1 sq.ft. spacing for the final development of your 6" violet. Although bigger pot sizes are quite popular, please note that they take up a lot of valuable production space.

Optimara provides very vigorous and large growing varieties. These plants already have the large growing characteristics and do not require any special handling. They are very fast growing plants able to finish into a 5 1/2" to 6" plant within 12 to 14 weeks from a starter. These varieties reduce the growing time by 2 to 4 weeks.

Growing the EverFloris

- **Growing** -- Growing the EverFloris to a beautiful large 6 inch finished plant requires very little additional steps. We recommend that you first transplant the large 6 inch plug into a 4 inch pot. Follow the general 4 inch growing procedures for about 6 to 7 weeks. Space these pots once after 2 to 3 weeks of growing time to keep them from stretching. After 6 to 7 weeks of growing in a spaced 4 inch pot, transplant the 4 inch EverFloris into a 6 inch pot.

(You can also plant the large plug straight into the final 6 inch pot; however, we have found that this method requires up to 2 extra weeks to finish. If you have the time and extra space available, this is a good way to save labor rather than needing to transplant.)

Keep the 6 inch pots unspaced, pot-to-pot, for 10 to 14 days. After the first week in the 6 inch pot, remove all visible flowers. After 2 weeks, space plants in their final spacing of about 1 pot per square foot. Depending on the geographic location, your crop should finish within 6 weeks from removing the first flash of flowers. Therefore, the total crop time to finish should be 14 to 16 weeks from receiving the EverFloris plug.

Since EverFloris produces a lot of flower buds constantly, you can effectively keep the crop for longer in your greenhouse. When flowers dry off, just pinch the dried flowers to keep the plants looking full and marketable. If you desire extra large plants, pull the blooms twice - the second, 3 weeks after potting. Six weeks later, you will have extra large plants.

- **Chemical Treatments --** We recommend that you drench the crop after planting the plug with Banrot mixed 14oz to 100 gallon, or a mix of Chipco 3336 at 7 oz to 100 gallon in combination with Aliette at 14oz to 100 gallon. Apply this in a drench within 7 days of potting to protect against soil born diseases such as Rhizoctonia, Phytophthora or Pythium. Another very effective fungicide is Subdue MAXX. We recommend 1 (one) oz per 100 gallon. Apply in a regular drench after potting.

- **Watering --** Keep soil moist but not wet and start feeding right away after planting. We recommend a well balance fertilizer such as Excel 15-15-15 or the Optimara 14-12-14.

Use 50 ppm, 1 oz per 14 gallon, for constant feeding, or 100 ppm every other week. If you use an injection system, we recommend a setting of 1:200 with a Stock Solution of 12oz per gallon. Your target EC reading should be after 8-10 weeks of about 1.5. Water from overhead with tepid water (70-75 degrees) if no warm water is available. We recommend to water in the early morning hours. Start sub-irrigation after the second flash of flowers start showing color. Since the first flash will be removed anyway, you can continue overhead watering while the plants are in the 4 inch pot.

- **Lighting --** EverFloris grow best under 900 to 1000 foot candles of light.

PLANT PROTECTION - PEST AND DISEASE CONTROL

- **In General** -- For a complete list of chemicals used in the violet production, concentrations per application, and active substances, see tables at the end of this section or call the office at 1-800-443-2290 if you have specific questions.

Plant protection procedures for African Violets should "only" be performed in the late afternoon and under moderate greenhouse temperatures. If used at temperatures of above 80°F, some chemical have a devastating effect on your crop. The water temperature of the spraying solution should not be below 70 to 75°F, depending on the leaf temperature of the plants. Be careful with plants in bloom! Spray-mist plants only very lightly, because otherwise damage to the blooms could occur. The ideal spraying method for violets is Colfogging at about 2000 lbs. This method leaves little or no residue on the plants.

- **Watch Out!** -- Some spray chemicals can cause severe damage on the blooms. Always make sure that when using unfamiliar spray or drench chemicals you test them on a small test group (i.e. one table). Do not apply a new method to your whole crop all at once - You may loose your crop!

Pests

These are preventive measures to fight pests: Approximately 10 days after potting, you should spray African Violets with Vydate to control nematodes. This spraying sequence is a good preventive measure for fighting the most common pests.

- **Mites** -- One can recognize mite infestation by the very hairy, deformed, and yellowish looking leaves in the center. The growth is disturbed. If the plants have not been treated on time, the damage occurs also on the blooms. The first flowers are often very small and crippled; sometimes they do not appear at all.

If you notice that the plants are infested by mites, spray the entire African Violet crop with either Avid, Thiodan 35 or Kelthane MF three times over the following 10 days. Kelthane is our preferred choice, however, it leaves a light residue on the plants.

- **Leaf Nematodes** -- Leaf nematodes appear on the underside of the leaves. You will see a glassy, shiny tissue on the underside of the plants between the main veins. The leaves will look wilted and show brown spots. Heavily infested plants will be stunted in growth, and individual leaves will die off.

If you detect any signs of leaf nematode infestation, spray Vydate or Metasystox. For maximal control, apply 30 gallons of spray to 10,000 sq.ft. until the surfaces of the plants are wet. Repeat the spraying 2-3 times within 10-12 days to get rid of all nematodes.

• **Root Nematodes** -- As the name indicates, root nematodes attack the roots of African Violets. The infestation is recognizable by the light brown lumps on the roots. Growth is also stunted.

In this case, we recommend to drench with Vydate or Metasystox , i.e., once a week over a three week period. During the application, the root system should become quite moist in order to achieve good results.

• **Strawberry Nematodes** -- The infestation by strawberry nematodes looks similar to the one caused by mites. However, in contrast to the mite infestation, the young leaves are heavily deformed and have almost no hair at all. These African Violets grow very slowly and produce numerous tiny and very hard leaves in the heart of the plant.

This pest can be treated the same way as the leaf nematodes. But in this case we recommend to spray 3 times within 10 days.

• **Thrips (Western Flower Thrips)** -- Thrips is currently one of the most unpleasant pests affecting the African Violet. It is very difficult to get rid off once your crop is infested. The most obvious indication of thrips is the presence of pollen on the blossoms right under the anthers. The pest itself can be seen on the anthers and on the calyx. If you touch the anthers with your fingernail, the thrips appear on the blossoms. Young thrips are about 1/16" long and white to grey in color. Adult thrips have wings and are yellowish brown.

The treatment against thrips has to be done on a regular basis. A firm preventive spray program is essential. If you have a very heavy thrip infestation, you should treat the plants 2 times per week for 4 consecutive weeks. A one-time treatment only does not kill all the thrips. Products that yield good results are Monitor, Avid or Orthene.

• **Mice** -- During fall, when it gets colder outside, you can expect the presence of mice in the greenhouse. If you find anthers that are gnawed off, it is time to do something against these intruders. Use regular mice controls.

Fungal Protection

The best preventive measures against fungi are absolute hygiene and cleanliness in the greenhouse. Train your personnel to remove infested plant material and request that they wash their hands after touching an infested plant before continuing their work with other plants. Furthermore, make sure that the tables are disinfected before new plant material is placed on the same spot where the infested plant was removed. Diseased plants are usually identified in time. Careless handling, however, causes the disease to spread and to get out of control. The major diseases are outlined below:

• **Phytophthora (Crown Rot)** -- A sure indication of Phytophthora is the brown rot that develops first at the plant's base. As the infestation continues, the entire plant starts rotting. Once

a plant is affected by the Phytophthora fungus, it is lost and should be removed from the table. The fungus spreads very easily in a crop that is too moist in combination with excessive greenhouse temperatures.

You should take preventive action against Phytophthora. A reliable method is to drench the African Violets with an Aliette-Benlate combination (125 combined with 50 parts per mil or 1oz. Aliette combined with 1/2 oz. Benlate to 6 gallons) right after potting. Spraying Banol, or the combination of both Banol and Benlate, is another good preventive step. A third possibility is to blend Ridomil MZ into the potting mix.

• **Powdery Mildew --** During spring and fall, African Violets are likely to become infested with powdery mildew if the outside temperatures are low and there are cool drafts in the greenhouses during ventilation. One can recognize grayish-white, powderlike spots on the blooms as well as on the leaf surfaces. As a preventive method, we recommend to use sulfur burners. You should let the sulfur burners run for 90 minutes every night at about midnight. You will need about 5 burners per 10,000 sq.ft. of greenhouse space.

Another very effective treatment against powdery mildew is to spray with Pipron or Nimrod. Spray the solution under high pressure high into the greenhouses so that it is spread evenly over the plants. The plants should not be sprayed dripping wet, i.e., spray about 5 gallons per 10,000 sq.ft. greenhouse space. Be careful with Nimrod, African Violets that are in bloom should not be sprayed with this chemical since it can cause severe damage to the flowers.

• **Botrytis --** Botrytis is a grayish green mold which first appears on the blooms and on the leaves. At a later stage, the blooms and leaves start rotting. As a preventive measure, we recommend to install air circulating fans within the greenhouse. The fans keep the air flowing and help reduce botrytis. The right humidity lies between 60-75%. In cases of 95% humidity and above, it is recommended to slightly increase the greenhouse temperatures and to open the air vents or air fans in order to lower the high humidity rate.

Another effective preventive measure during humid summer months is the spraying of Ornaline. You should apply Ornaline once a week over your flowering crop to kill any potential development of Botrytis. We also recommend to spray the plants one day before they are boxed up and shipped, thus, preventing Botrytis during distribution. You can also experiment with Benlate against an infestation by botrytis. However, you have to count with some residue and spray spots on the blooms.

• **Rhizoctonia --** You can recognize a Rhizoctonia infestation by the black rot around the base of the plant. When the plant is severely infested, it is lost. You should immediately remove the infested plant to prevent further spreading.

Treat Rhizoctonia by drenching the infested African Violets with Benlate.

- **Cylindrocarpon** -- Unlike Rhizoctonia, Cylindrocarpon affects only the petioles of African Violets. An unmistakable sign is the brownish rot in the petioles. Rot nematodes live on these spots, but they do not directly harm the plants. The treatment of Cylindrocarpon is the same as the one against Rhizoctonia.



PLANT-PROTECTIVE AGENTS, ACTIVE SUBSTANCES & APPLICATION

* in U.S. units of measure

INSECTICIDES

<i>Trade Name</i>	<i>Active Substance</i>	<i>Oz. per Gallon</i>
Avid	Avermectin B ₁	<u>1 oz. to 7 1/2 gallons</u>
Spray 0.1% against thrips. You can apply it on blooming plants with very little damage.		
Kelthane MF	Dicofol	<u>1 oz. to 7 1/2 gallons</u>
Spray 0.1% against mites. CAUTION: Leaves a lot of residue on the plants.		
Metasystox	Oxydemeton-methyl	<u>1 oz. to 7 1/2 gallons</u>
Spray 0.1% against thrips and nematodes. Drench against root nematodes.		
Monitor	Methamidophos	<u>1 oz. to 7 1/2 gallons</u>
Spray 0.1-0.12% against thrips even on blooming African Violets CAUTION: This product is very good, but has a very strong odor.		
Thiodan 35	Endosulfan	<u>1 oz. to 7 1/2 gallons</u>
Spray 0.1% against mites.		
Vydate	Oxamyl	<u>1 oz. to 7 1/2 gallons</u> Spray 0.1%
against nematodes, mites, and leaf nematodes. Drench against root nematodes. GOOD for disinfecting tables at a concentration of 1 oz. to 5 gallons.		

FUNGICIDES

<i>Trade Name</i>	<i>Active Substance</i>	<i>Oz. per Gallon</i>
<i>Aliette</i>	Aluminiumfosethyl	<u>1 oz. to 5 gallons</u>
Drench 0.15% against Phytophthora. Use as drench after potting in conjunction with Chipco (0.125% Aliette combined with 0.05% Chipco).		
<i>Banrot</i>	Etidiazole+thiophanate methyl	<u>1 oz. to 7 1/2 gal.</u>
Light drench 0.1% against Pythium, Phytophthora, Rhizoctonia		
<i>Nimrod</i>	Bupirimate	<u>1 oz. to 12 gallons</u>
Spray 0.075% against powdery mildew. CAUTION: Nimrod will cause burn on your flowers, and should therefore not be used on flowering crop.		
<i>Ornaline</i>	Vinclozolin	<u>1 oz. to 7 1/2 gallons</u>
Spray 0.05-0.1% against Botrytis.		
<i>Pipron</i>	Piperalin	<u>1 oz. to 12 gallons</u>
Spray 0.075% against powdery mildew. Pipron can be used on a flowering crop. Damage to the flowers is minimal.		
<i>Ridomil MZ</i>	Metalaxyl	<u>3 oz. to 4 cubic yards</u>
Mix into potting mix against Phytophthora.		
<i>Subdue</i>	Metalaxyl	<u>1/2 oz. to 100 gallons</u>
Drench after potting as preventive program against Pythium and Phytophthora. CAUTION -- This product can produce severe stunted growth. Do not use in conjunction with Ridomil MZ in the mix.		

Methods of Application

- **Spraying** -- Apply product with about 400 lbs. pressure sprayer. Spray the solution under high pressure up into the greenhouse so that it is evenly distributed over the plants. The plants should not be dripping wet. Apply 5 gallons per 10,000 sq.ft. of production space, unless the preceding guidelines recommend otherwise.
- **Colfogging** -- Spray at about 2000 lbs. This is the preferred spraying method since the spray leaves little or no residue on the plants. When using this method always use 7 times the recommended oz. per gallon, i.e., 1 oz. per 7 1/2 gallons should be applied at 7 oz. per 7 1/2 gallons. Apply 2 1/2 gallons to 10,000 sq.ft. of production space. Fog up high into the air so the mist will settle in a nice and even distribution on the plants.
- **Drenching** -- Drench at a rate of about 3/4 gallon per square yard.

We would like to point out that the directions about chemical uses have been gradually established after years of experimentation in our greenhouses. However, we always recommend to our customers to first test pest control treatments on a small area of their crop. If the results are positive, the treatment may then be applied to the entire crop.

CAUTION

All chemicals need to be applied by trained personnel. Extreme caution has to be exercised. Please always read the label of the product in detail. Always wear protective clothing, and observe re-entry time. Never store chemicals in any other container than the original container it was provided in !!!

Disclaimer: The Holtkamp Greenhouses, Inc. makes no guarantees, either expressed or implied, regarding the recommendations in this guideline. It reserves the right to make changes to these recommendations at any time. The company is only providing recommendations and does not assume any responsibility for anybody following these recommendations. The company may not be held liable for any damages. Unique wing conditions may require different treatments, calling for the judgement of the person reading and following these guidelines.