Experimental Plants

African Violet
Species: *ionantha*
Genus: *Saintpaulia*
Family: Gesneriaceae
Order: Scrophulariales
Class: Magnoliopsida
Phylum: Tracheophyta
Kingdom: Plantae

Begonia
Species: varies
Genus: *Begonia*
Family: Begoniaceae
Order: Violales
Class: Magnoliopsida
Phylum: Magnoliophyta
Kingdom: Plantae

Bromeliad
Species: varies
Genus: *Neoregelia*
Family: Bromeliaceae
Order: Bromeliales
Class: Liliopsida
Phylum: Magnoliophyta
Kingdom: Plantae

Coleus
Species: varies
Genus: *Solenostemon*
Family: Lamiaceae
Order: Lamiales
Class: Magnoliopsida
Phylum: Magnoliophyta
Kingdom: Plantae

Geranium
Species: *zonale*
Genus: *Geranium or Pelargonium*
Family: Geraniaceae
Order: Marchantiales
Class: Magnoliopsida
Phylum: Magnoliophyta
Kingdom: Plantae

Kalanchoe
Species: *blossfeldiana*
Genus: *Kalanchoe*
(synonym Bryophyllum)
Family: Crassulaceae
Order: Saxifragales
Class: Magnoliopsida
Phylum: Magnoliophyta
Kingdom: Plantae

Norfolk Island Pine
Species: *heterophylla*
Genus: *Araucaria*
Family: Araucariaceae
Order: Pinales
Class: Pinopsida
Phylum: Pinophyta
Kingdom: Plantae

Podocarpus
Species: varies
Genus: *Podocarpus*
Family: Podocarpaceae
Order: Pinales
Class: Pinopsida
Phylum: Pinophyta
Kingdom: Plantae

Spiderwort
Species: varies
Genus: *Tradescantia*
Family: Commelinaceae
Order: Commelinales
Class: Liliopsida
Phylum: Magnoliophyta
Kingdom: Plantae

Wandering Jew
Species: varies
Genus: *Nephrolepis*
Family: Nephrolepidaceae
Order: Polypodiales
Class: Polypodiopsida (Pteridopsida)
Phylum: Pterophyta
Kingdom: Plantae

Zamia
Species: varies
Genus: *Zamia*
Family: Zamiaceae
Order: Cycadales
Class: Cycadopsida
Phylum: Cycadophyta
Kingdom: Plantae

Zebrina
Species: varies
Genus: *Zebrina*
Family: Commelinaceae
Order: Commelinales
Class: Liliopsida
Phylum: Magnoliophyta
Kingdom: Plantae

Conditions for Customer Ownership

We are a USDA compliant facility and hold all necessary permits to transport our organisms. Each state is assisted by the USDA to determine which organisms can be transported across state lines. Some organisms may require end-user permits. Please contact your local regulatory authorities with questions or concerns. To access permit conditions, click here.

Never purchase living specimens without having a disposition strategy in place. Live specimens should not be released into the wild! Please dispose of any unwanted organisms using the guidelines below.

Primary Hazard Considerations

None.

Availability

- These plants are generally available year round, as they are grown in our greenhouse. Please give at least 24 hours notice when ordering these plants.
- These plants are shipped in plastic pots with soil. For shipping purposes, a cardboard disc is used to hold the plant and soil in place. The potted plant is sealed in a plastic bag and wrapped in corrugated cardboard. Upon receipt, remove the potted plant from the bag, remove the cardboard disc, and water immediately.

Care

- African violets require moderate to bright light; avoid direct sunlight. They should be kept moist, but avoid over watering them. Water when the soil surface is slightly dry to the touch. Keep water off of the leaves. Plant them in an African violet potting mix or an equal mix of potting soil, peat moss, and vermiculite. A fertilizer formulated for blooming houseplants can be used.
- *Begonias* require light to partial shade. They should be kept moist; a little less in winter. Plant them in a *Begonia* potting mix or a mix of potting soil and peat moss. A fertilizer formulated for blooming plants can be used occasionally.
- *Bromeliads* require moderate light. They do best when placed within 8 feet of a sunlit window. Allow the soil to dry out a little between watering. They can be planted in a general all-purpose soil. A general purpose fertilizer can be added to the soil at ⅓ to ½ the dosage every 1–2 months.
- Coleus and *Geraniums* require bright light. They do best when placed within 3 feet of a sunlit window. Keep the soil moist (but not wet or soggy) at all times. Plant them in an all-purpose potting soil, and use a fertilizer at the rate recommended on the package.
- *Kalanchoe* require moderate to bright light. Allow the soil to dry out between watering. Keep water off of the leaves, and do not over water. Plant them in a mix of peat moss, sand, and vermiculite. You can fertilize the plant using an all-purpose fertilizer once you see new growth. Fertilize at ¼ to ½ of the recommended dosage every second week.
- Norfolk Island Pines require shade to moderate light. Allow the top of the soil to dry out between watering. These plants also require relatively high humidity (50%); mist them regularly, or set up a humidifier. Plant them in an all-purpose potting soil. You can fertilize them every few months with an all-purpose fertilizer.
- *Podocarpus* require moderate light. They do best when placed within 8 feet of a sunlit window. Allow the top of the soil to dry out between watering. Plant them in a slightly acidic soil. You can add some sand to the soil. Fertilize with a balanced fertilizer according the instructions on the package.
- Spiderworts and *Zebrinas* require moderate to bright light. Allow the top 1–2" of soil to dry out between watering. Plant them in an all-purpose potting soil and fertilize them in the spring after replanting.
- Wandering Jews require bright light. They will tolerate some direct light. Keep them moist, but avoid over watering. Water when the soil surface is slightly dry to the touch. Plant them in an all-purpose potting soil with some peat moss and sand added to it. You can fertilize them with an all-purpose fertilizer twice per month at half the recommended dosage.
- *Zamias* require shade to bright light. Allow the soil to dry out completely between watering. Plant them in a well-draining mix of potting soil and sand. You can fertilize 3–4 times per year with a palm fertilizer.

All of these plants do best at room temperature (65–75°F).

Plant	Class	Propagation by
African Violet	Dicot	Leaf Cuttings or Division
Begonia	Dicot	Stem or Leaf Cuttings
Bromeliad	Monocot	Seed or Offshoot Cuttings
Coleus	Dicot	Stem Cuttings
Geranium	Dicot	Stem Cuttings
Kalanchoe	Dicot	Stem or Leaf Cuttings
Norfolk Island Pine	Conifer	Stem Cuttings or Air Layering
Podocarpus	Conifer	Stem Cuttings
Spiderwort	Monocot	Stem Cuttings
Wandering Jew	Monocot	Stem Cuttings
Zamia	Cycad	Seed
Zebrina	Monocot	Stem Cuttings

Always age tap water at least 24 hours before using it to water plants, or use rainwater.

Life Cycle

- Perennials grow and bloom over the spring and summer and die back every autumn and winter, then return in the spring from their root-stock rather than seeding themselves as an annual plant does. Perennial plants can be short-lived (only a few years) or they can be long-lived, as are some woody plants like trees which can live for over 4,000 years. Perennials reproduce by vegetative reproduction. African violets, coleus, spiderworts, Wandering Jews, and *Zebrinas* are perennials.
- An annual plant is a plant that usually germinates, flowers, and dies in a year or season. These plants reproduce by transferring pollen from the male part of the plant to the female part. Different types of Begonias can be perennial or annual, but the fibrous *Begonias* we provide are annuals.
- *Bromeliads* reproduce at the end of their blooming cycle. They develop offshoots as they bloom, and at the end of their blooming period, the parent plant dies back.
- *Geraniums* can be annual, biennial, or perennial, depending on the species. The ones we provide are perennial.
- *Kalanchoe blossfeldiana* is a succulent and may flower year-round. The plant reproduces by forming "plantlets" on its leaves, and dropping them to the ground. These little plants go on to become full plants.
- Norfolk Island Pines, *Podocarpus* and *Zamias* are dioecious conifers, with male cones on one plant and female cones on another plant. Reproduction is by wind-pollination.

Wild Habitat

- African violets are native to eastern tropical Africa.
- *Begonias* are native to South and Central America, Africa, and southern Asia.
- *Bromeliads* are native mainly to the tropical Americas.
- Coleus are native to tropical Africa, Asia, Australia, the East Indies, the Malay Archipelago, and the Philippines.
- *Geraniums* are distributed worldwide.
- *Kalanchoe* are native mainly to the Old World, with a few species now in the New World.
- Norfolk Island Pines are native to Norfolk Island, a small island located between Australia, New Zealand and New Caledonia.
- *Podocarpus* are originally native to the temperate forests of the southern hemisphere, especially New Zealand.
- Spiderworts and Wandering Jews are native to the New World from southern Canada to northern Argentina.
- *Zamias* are native to North, Central and South America.
- *Zebrinas* are native to tropical and subtropical areas of the Americas.

Suggested Experiments

- Coleus are popular for demonstrating many plant functions because they grow rapidly and show environmentally-induced changes readily. One of the most interesting changes is the variation in color and growth depending upon the length of day and intensity of light. Take six small coleus in pots, making sure that they are of the same variety, and then subject each individual to a variation in day length by the use of opaque covers (these may be constructed of black paper) to shorten day length, and artificial light for extended day length. A control plant should be kept under natural daylight periods. At the end of a few weeks, obvious differences in the color pattern, rate of growth, and type of growth will have occurred. These differences may be correlated with the amount of light the plants have received. All other conditions such as pot size, type of soil, and amount of water, etc., should be the same.
- The effect of terminal bud auxin on plant growth is also readily demonstrated with Coleus. Select three to six plants of about the same size and growth habit. One will be a control and the other plants will have their terminal buds removed. At the end of a few weeks, the difference in the growth pattern will demonstrate the importance and activity of auxin from the terminal bud.
- Further demonstration of hormone activity can be made using an auxin called indoleacetic acid in a lanolin paste. Remove all of the terminal buds from three plants and use a fourth plant for a control. On one of the experimental plants place the lanolin-indoleacetic acid paste on the cut surfaces. On another experimental plant place plain lanolin on the cut surfaces. On the third experimental plant do not place anything, leaving the plant alone without its terminal buds. At the end of several weeks compare the growth in all four plants. Make sure all other conditions—temperature, light, soil, size of pot, watering—are the same for all plants.
- To demonstrate the importance of carbon dioxide to plants, use a Geranium plant that has been kept in the dark for two days. This removes the majority of the starch from the leaves. Upon removing the plant from the dark, cover one of the leaves with clear cellophane, sealing all edges with tape. Then expose the plant to sunlight for several days. At the end of this time, the covered leaf should not give a positive starch test, while the other leaves will.
    - To test for starch, remove the covered leaf and one of the others. To remove the chlorophyll, which would interfere with the color test, place the leaves in a beaker half filled with alcohol. Place the beaker in a water bath (a larger beaker partially filled with water will be suitable) and boil over a hot plate until the leaves become blanched. Do not use a Bunsen burner or other open flame as the fumes of alcohol are highly flammable. When the leaves are blanched, rinse well in water and place on the bottom of a Petri dish. Cover with Lugol's iodine solution* and leave until darkening is complete. Rinse off the iodine solution and view against a white background. The presence of blackish areas indicates starch.

Other experiment suggestions include:

- Plants in different environments (light intensity/photo period/color/water).
- Effect of nicotine or second hand smoke.
- Hydroponic vs. soil growth.
- Artificial light vs. real light.
- The effect of music on varying types of plants.
- Chemical vs. organic fertilizer.
- Factors affecting growth, such as soil temperature or soil pH experiments.
- Effects of pollutants (road salt, sewage runoff).

Disposition

We do not recommend releasing any laboratory specimen into the wild, and especially not specimens that are not native to the environment. When finished with your plant please dispose of it by incineration in a well-ventilated area.

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