ZZ plant is an easy tough indoor use

By Matthew Blanchard and Roberto Lopez

ZZ plant, *Zamioculcas zamiifolia*, is becoming more popular as an indoor plant because of its glossy, dark-green foliage, limited disease and insect problems and performance under low light and restricted water availability. In 2002, the Florida Nursery, Growers & Landscape Association named the ZZ plant a Florida Plant of the Year.

The ZZ plant requires a relatively long growing cycle and high temperatures to produce a marketable crop. For the past several years, researchers at Michigan State University have been investigating how to efficiently produce this plant.

A ZZ plant is good for interiorscapes because of its glossy leaves, limited pest problems and performance under low light.

Characteristics

Native to East Africa, the ZZ plant is hardy in USDA Hardiness Zones 9b-11 and reaches 2-3 feet tall and 3 feet wide. The plant produces a short, yellow-brown flowering spadix at its base, but the flowers are not showy.

Beneath the soil, the ZZ plant produces round rhizomes that function to store water. The formation of these rhizomes makes it an interesting plant to propagate because they often develop during the rooting of vegetative cuttings.

The ZZ plant can be propagated vegetatively either by division or cuttings. Because division requires a grower to begin with several large stock plants, this propagation method is often impractical. With this in mind, we focused on using vegetative cuttings.

Study results from MSU

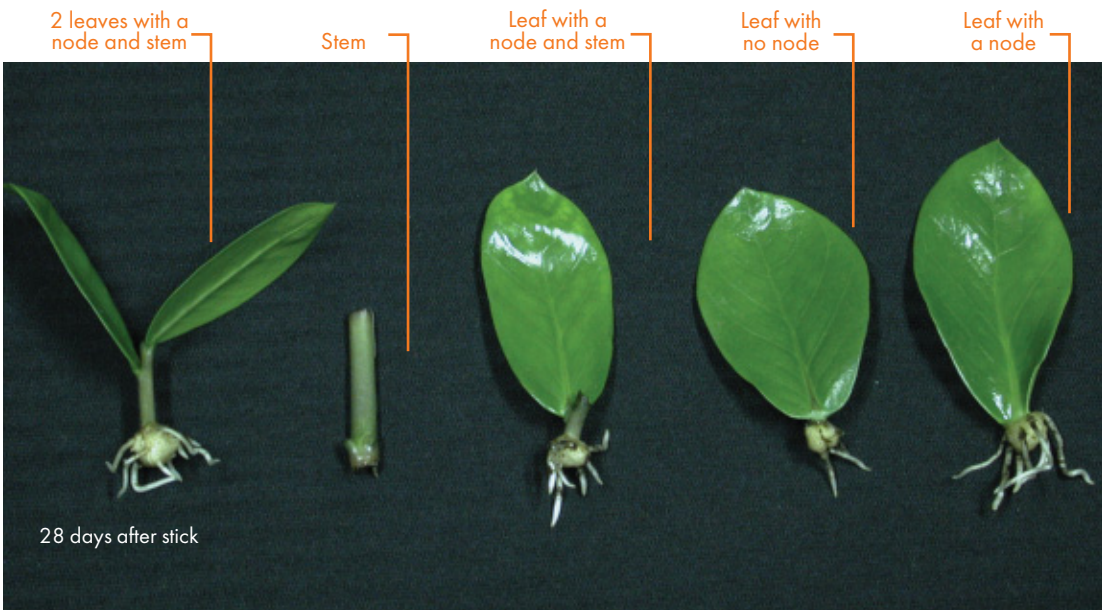
Best type of cuttings. The goal of one of our studies was to determine the best type of vegetative cuttings that would root and produce the greatest number of rhizomes during propagation. Five types of cuttings were harvested from stock plants: two leaves with a node and stem;

choice for

Zamioculcas zamiifolia survive most interior environments.

Effect of cutting type on rooting and finishing

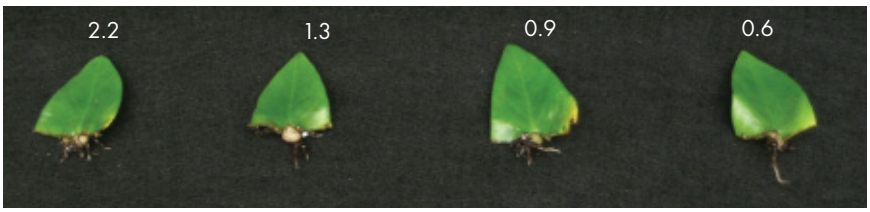
CUTTING TYPE



Four weeks after sticking, all leaf cuttings with or without stems or a node rooted and produced one large rhizome. Stem cuttings did not callus or root.

Effects of daily light integral during propagation

mol m^{-2} d^{-1}



Number of rhizomes after 43 days

4.7	4.5	4.7	3.2

ZZ plant is best propagated using apical leaf cuttings under a 16-hour photoperiod and a minimum daily light integral of 2 moles per square meter per day.

internode (stem); leaf with a node and stem; leaf without a node; and leaf with a node.

Cuttings were propagated in 72-cell plug trays filled with 50-percent commercial peat and 50-percent screened coarse perlite mix. The air and bench temperature set point of the propagation environment was 79˚F with a natural photoperiod.

Four weeks after sticking, all leaf cuttings with or without stems or a node rooted and produced one large rhizome. Stem cuttings did not callus or root.

Rooted cuttings were transplanted into 4-inch pots and grown at 90˚F under a 16-hour photoperiod provided by high-pressure sodium lamps. After 16 weeks, plants propagated from two-leaf cuttings with a node and stem were slightly larger than the one-leaf cuttings.

More than one cutting. Another study was conducted to determine if more than one cutting could be obtained from a single leaf. This could potentially reduce the number of stock plants needed for cutting production. Leaf cuttings were harvested and horizontally cut across the middle. The top portion of the leaf (apical cutting) and the bottom portion (basal cutting) were stuck approximately 0.5 inches into the propagation medium. Four weeks after sticking, apical leaf cuttings produced more (three to five) small rhizomes than basal leaf cuttings, which produced one large rhizome.

Impact of photoperiod. One study determined if rooting or rhizome development was influenced by photoperiod during propagation. Apical, basal and full leaf cuttings were stuck in propagation chambers under 9- and 16-hour photoperiods. Rooting and rhizome number were determined five weeks after sticking.

Both photoperiod and cutting type (apical or basal) influenced the number of rhizomes that developed. Apical leaf cuttings consistently developed more rhizomes than basal leaf cuttings, regardless of photoperiod. The greatest rhizome number (3.9) occurred when apical leaf cuttings were propagated under a 16-hour photoperiod. Full-leaf cuttings developed three rhizomes regardless of photoperiod.

Daily light integral influence. Daily light integral (DLI) is the quantity of light received each day and is expressed as the number of moles of light received per square meter per

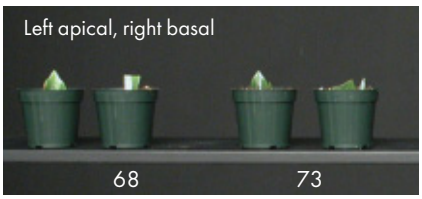
day (mol m^{-2} d^{-1}). To determine the effect of daily light integral on rooting, apical and basal leaf cuttings were propagated under four different woven shade curtains (0, 30, 50 and 70 percent shade). This provided four different daily light integral environments, ranging from 0.6 to 2.2 mol m^{-2} d^{-1}.

After six weeks, apical leaf cuttings propagated under a daily light integral of 0.9 to 2.2 mol m^{-2} d^{-1} produced an average 4.6 rhizomes compared to only 3.2 rhizomes when cuttings were rooted under a daily light integral of 0.6 mol m^{-2} d^{-1}.

The ZZ plant is best propagated using apical leaf cuttings under a

Effect of leaf cutting type and finishing temperature on production

17 weeks after transplant



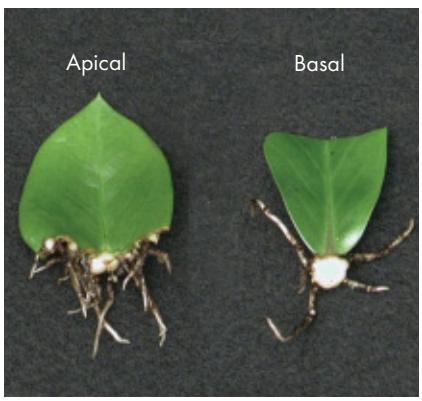
finishing temperature (˚F)

finishing temperature (˚F)

finishing temperature (˚F)

ZZ plant should be grown at high day and night growing temperatures (76˚F-90˚F). Average daily temperatures below 76˚F delay shoot emergence and the finish production time.

CUTTING TYPE



Effect of cutting type and photoperiod on rhizome development during propagation

Apical half leaf
Photoperiod: 9 hours, 16 hours
No. of rhizomes: 3, 3.9

Basal half leaf
Photoperiod: 9 hours, 16 hours
No. of rhizomes: 1.3, 1.3

Full leaf
Photoperiod: 9 hours, 16 hours
No. of rhizomes: 3, 3

16-hour photoperiod and a minimum daily light integral of 2 mol m^{-2} d^{-1}. During propagation, maintain an air and bench temperature set point of 75˚F-85˚F and a light intensity of 1,000-1,500 footcandles. Overhead misting and steam or fog should be used to maintain high relative humidity (90 percent).

Production guidelines

After propagation, plugs should be transplanted into 4- to 6-inch pots filled with a commercial peat-based medium. When finishing a 4-inch crop, plant one rooted cutting per pot. Larger pot sizes require additional plugs.

A new shoot emerges from the medium 40-50 days after transplant at average daily temperatures of 79˚F-84˚F. The number of new shoots that emerge from each leaf is related to the number of rhizomes at transplant. In our studies, leaf cuttings that developed five rhizomes during propagation initiated a similar number of new shoots two to three months after transplant. As shoots develop and new leaves unfold, the existing rhizomes enlarge and additional smaller rhizomes are formed.

One of the most important requirements for producing the ZZ plant is providing a warm day and night growing environment, in the range of 76˚F-90˚F. Average daily temperatures below 76˚F will delay shoot emergence and the finish production time. The production time for 4-inch plants grown at 84˚F is six to eight months. Larger pot sizes or cooler production temperatures lengthen the growing time. Produc-

Production schedule*

Propagation (72-cell liner)
Duration: 4 weeks
Temperature: 75°F-85°F
Light intensity (footcandles): 1,000-1,500

Finish in 4-inch pot
Duration: 24-32 weeks at 84°F
Temperature: 76°F-90°F
Light intensity (footcandles): 1,000-2,500

Finish in 6-inch pot
Duration: 32-40 weeks at 84°F
Temperature: 76°F-90°F
Light intensity (footcandles): 1,000-2,500

* Photoperiod for all is natural daylength or 16 hours.

tion length can be reduced and finished quality increased by planting more plugs per pot or using older plugs with larger rhizomes.

During the finish stage, the light level should be maintained at 1,000-2,500 footcandles using shade cloth to provide diffuse light. When growing at the upper end of the temperature range, 86°F-90°F, the light level should not exceed 2,000 footcandles to avoid scorching the leaf tips. Plants grown at a low relative humidity (less than 50 percent) and a temperature above 79°F may also show leaf tip burn symptoms.

Irrigation and fertilization

The ZZ plant grows best when the growing medium remains moist, but not completely saturated. Although the crop can tolerate a dry medium, repeated moisture stress will reduce growth and slow production time.

Fertilize with a balanced water-soluble fertilizer that supplies 125 to 150 parts per million nitrogen at every watering. A controlled-release fertilizer can also be either incorporated into or topdressed on the growing medium.

Plants have been observed to have very few disease or insect problems.

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