

Crop: Christmas Cactus (Thanksgiving or Holiday)
Scientific Name: Schlumbergera truncata (Cactaceae)

I. Introduction

- A. The Holiday cactus is now placed in the genus *Schlumbergera*, formerly being called *Zygocactus*, *Epiphyllum*, *Cereus* and *Cactus*.
- B. Plants normally flower in late November to early December. The normal flowering close to Thanksgiving and Christmas and gave rise to the names, Thanksgiving and Christmas cactus.
- C. Confusion exists in the description of these plants. Two species exist, *Schlumbergera truncata* and *Schlumbergera bridgesii*.
- D. The plants are epiphytic cacti and are native to a small region in the Organ Mountains north of Rio de Janeiro in South America.
- E. *Schlumbergera truncata* grows in the rain forest at an altitude between 3,000 and 5,000 feet. The plants root into plant debris trapped among branches or on decaying humus in stony, shady places.
- F. Rainfall varies from 430 mm (17 inches) per month during December-March to 80 mm (3 inches) per month in the dry season.
- G. Temperatures are fairly constant at 16-21°C (60-70°F).
- H. The Organ Mountains are located 22° S latitude. The photoperiod ranges from about 11 hours to 13.5 hours.

II. Species, Cultivars, Breeding, Development

- A. The Christmas cactus is the species *Schlumbergera bridgesii*. It is characterized by smaller, smoothed-edged stems (segments).
- B. The plants most often sold as Christmas cacti are actually the Thanksgiving cacti, *Schlumbergera truncata*. They are characterized by segments with toothed or jagged edged joints. Flowers appear earlier than on *Schlumbergera bridgesii* under natural photoperiods.
- C. *Schlumbergera bridgesii* originated at somewhat higher altitude in the mountains and in cooler, drier, wooded environment.

- D. Considerable breeding has been conducted both in Europe and the United States. Many excellent cultivars are now available.

III. Flower Induction Requirements

- A. *Schlumbergera truncata* is a short day plant. Days become sufficiently short for flower induction about September 15. The actual date of flower induction is modified by temperature. High temperatures in mid-September will delay induction.
- B. Temperatures of 15-20°C (59-68°F) are optimum for flower induction. Temperatures of above 20°C (68°F) delay flowering under short days compared to 15-20°C (59-68°F), 10°C (50°F) prevents flower initiation.
- C. Flowering can be controlled like any other short day plant. Two hours of night interruption lighting will inhibit flowering under short day conditions. Short days (at least 12 hours darkness, preferably 13 to 14 hours) will induce flowering under natural long day conditions. Short days should be maintained continuously (7 days a week) for at least 20 to 25 days. Photoperiod has no effect on flower development after initiation.
- D. Phylloclades (pads or segments) 1 cm in length or shorter (20 days or less after emergence) will not initiate flowers and should be removed when plants are placed under short days in a process called leveling or twisting. Older pads can also be removed to even the plant during leveling. Plants should be placed under short days for at least 5 days prior to leveling (10 days when temperatures are above 20°C (68°F)). Plants leveled and left under long days or immediately shifted to short days will form vegetative segments instead of flowers. Plants can still be leveled when flower buds 1 to 2 mm in length are visible on the plants.
- E. Flower number is promoted by:
- leveling versus not leveling
 - maintaining short days 7 days a week under natural long days
 - maintaining night temperatures at 16 to 20°C (62 to 68°F)
 - avoiding water stress during flower induction and initiation
 - avoiding high nutrient levels just prior to flower induction
 - application of 50 ppm benzyl-adenine 7 to 10 days after the start of short days
- F. Flower buds are visible microscopically after 12-14 days and macroscopically 3-4 weeks after initiation under short photoperiods.

IV. Environmental Requirements

A. Light

1. Plants can be grown under full sunlight in late fall, winter and early spring but should be shaded during the summer.
2. Marginal chlorosis is common on plants grown under high light conditions in the summer.

B. Temperature

1. Vegetative plant growth rate increases as temperature increases from 10 to 25°C (50 to 77°F). Reasonable growth rates occur at 18-21°C (65-70°F), growth is very slow below 16°C (60°F).
2. Flowering time from visible bud is a function of temperature (see table next page).

C. Water

1. Christmas cactus are from relatively moist environments. However, plants do not tolerate a wet soil with low aeration. Best growth occurs with a moist, well aerated soil.

D. Nutrition

1. Application of 150 ppm N, 225 ppm K, and 70 ppm Mg works well for top watering. Rates should be reduced in half if plants are sub-irrigated. Nitrate is the nitrogen source of choice. Magnesium requirements are higher than in most plants.
2. Stopping fertilization 1-2 months prior to the start of short days increases the percentage of phylloclades with flower.

Time to flower for *Schlumbergera truncata* grown at various temperatures based on initial flower bud length.

Bud Length (mm)	Temperature (C)				
	12	15	18	21	24
	<i>Days to Flower</i>				
1	113	68	49	38	31
2	94	57	41	32	26
3	84	51	36	28	23
4	76	46	33	26	21
5	70	43	31	24	20
6	65	40	28	22	18
7	61	37	27	21	17
8	58	35	25	20	16
9	54	33	24	19	15
10	52	31	23	18	14
11	49	30	21	17	14
12	47	28	20	16	13
13	45	27	20	15	13
14	43	26	19	15	12
15	41	25	18	14	11
20	33	20	15	11	9
25	27	17	12	9	8
30	23	14	10	8	6
40	15	9	7	5	4
50	9	6	4	3	3
60	4	3	2	1	1

12°C	=	54°F
15°C	=	59°F
18°C	=	65°F
21°C	=	70°F
24°C	=	75°F

V. Cultivation

A. Propagation

1. Plants are propagated by stem cuttings, often consisting of one stem section.
2. Bottom heat should be applied at 25°C (77°F).
3. Propagation for the following year begins in January for 11 cm (4.5 inch) pots and ends by March for 9 cm (3.5 inch) pots.
4. Fertilization begins after rooting about 2-3 weeks later.

B. Medium and planting

1. Plants should be planted in a medium high in organic matter with good drainage. A mix with 40% perlite and 60% peat works well.
2. The pH should be 6.0 to 6.2.
3. The number of cuttings planted per pot varies with cultivar and pot size. Two plants per pot for 9 cm (3.5 inch) pots, 3 to 4 plants per pot for 10 cm (4 inch), and 3-5 plants per pot for 11 cm (4.5 inch) pots.

C. Spacing

1. Plants can be grown pot to pot during most or all of the forcing period depending upon final size.
2. Plants can also be grown in hanging baskets.

D. Pinching

1. Plants should be pinched after propagation by removing the first apical pad when it is about 1 cm (0.5 inch). This pinch increases the number of shoots developing from the base of the plant. Plants can similarly be pinched back once or twice during the late spring and early summer to increase branching.

E. Growth Regulators

1. Benzyl-adenine (50 to 100 ppm) can be applied 10-14 days after the start of short days or when buds can first be seen (small

rounded growths) under normal short days to increase bud number.

2. Silver thiosulphate (200 ppm) applied during the 2 weeks prior to market reduces flower bud drop induced by water stress or ethylene.

VI. Problems

A. Insects

1. Fungus gnats can also cause problems if the population becomes high.
2. Caterpillars can be a serious pest.
3. Do not use Diazinon on plants as severe stunting and distortion can occur.

B. Diseases

1. The major disease problem is Fusarium. Fungus gnats and Fusarium can combine to cause major losses. Regular fungicide applications are essential. Rogue infected plants immediately. Subirrigation reduces the spread of Fusarium.
2. *Phytophthora parasitica* and *Pythium aphanidermatum* cause basal stem and root rot.
3. *Phytophthora* infected stems appear wilted and dull, gray green. Near the soil line, water-soaked but rather firm necrotic areas with faded red borders occur. Phylloclade abscission is common.
4. Plants infected with *Pythium* have similar symptoms without phylloclade abscission and the faded red colored border. Rotting occurs faster, however.

C. Nematodes

1. Christmas cactus can be attacked by *Heterodera cacti*. Heavily infected plants are stunted, exhibit red-colored stem tops and are unsalable.

VII. Scheduling

Growing Time For Cultural Segment	Cultural Procedure	Temperature
	Propagate cutting	25°C (75°F)
3-4 weeks	↓ V	
	Transplant rooted cuttings	18-21°C (65-70°F)
5-6 months	↓ V	
	Start short days	18°C (65°F)
5-10 days	↓ V	
	Level Plants	18°C (65°F)
7-10 days after start of short days	↓ V	
	Apply benzyl-adenine ²	15-20°C (59-60°F)
7-8 weeks	↓ V	
	Flower	

²Optional