

## Lesson B1–4

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# Growing Poinsettias

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**Unit B.** Floriculture

**Problem Area I.** Greenhouse Crop Production

**Lesson 4.** Growing Poinsettias

### **New Mexico Content Standard:**

**Pathway Strand:** Plant Systems

**Standard: III:** Apply fundamentals of production and harvesting to produce plants.

**Benchmark: III-A:** Apply fundamentals of plant management to develop a production plan.

**Performance Standard:** 1. Identify and select seeds and plants. 2. Manipulate and evaluate environmental conditions (e.g., irrigation, mulch, shading) to foster plant germination, growth and development. 3. Evaluate and demonstrate planting practices (e.g., population rate, germination/seed vigor, inoculation, seed and plant treatments). 6. Control plant growth (e.g., pruning, pinching, disbudding, topping, detasseling, staking, cabling, shearing, shaping).

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

1. Discuss the history and importance of the poinsettia.
2. Describe how poinsettias are propagated.
3. Schedule a potted poinsettia crop.
4. Identify major poinsettia pests and disorders, as well as controls.

**List of Resources.** The following resources may be useful in teaching this lesson:

**Recommended Resources.** One of the following resources should be selected to accompany the lesson:

Biondo, Ronald J. and Dianne A. Noland. *Floriculture: From Greenhouse Production to Floral Design*. Danville, Illinois: Interstate Publishers, Inc., 2000.

**Other Resources.** The following resources will be useful to students and teachers:

Boodley, James W. *The Commercial Greenhouse*, Second Edition. Albany, New York: Delmar Publishers, 1998.

Ball, Vic. *Ball RedBook*, Sixteenth Edition. Batavia, Illinois: Ball Publishing, 1998.

Schroeder, Charles B., et al. *Introduction to Horticulture*, Third Edition. Danville, Illinois: Interstate Publishers, Inc., 2000.

McMahon, Robert W. *An Introduction to Greenhouse Production*. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University.

## List of Equipment, Tools, Supplies and Facilities

Writing surface  
Overhead projector  
Transparencies from attached masters  
Copies of student lab sheets  
Computer  
LCD projector  
Plants and materials for producing a poinsettia crop

**Terms.** The following terms are presented in this lesson (shown in bold italics):

Bracts  
Breaks  
Flower bud development stage  
Flower bud initiation stage  
Flowering stage  
Photoperiodic  
Pinching  
Poinsettias  
Thermoperiodic  
Vegetative stage

**Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

*Ask the class to name plants associated with Christmas. The poinsettia should surface as the most common plant mentioned. Reinforce the students' memories of the holiday season by showing pictures of poinsettias used to decorate churches, malls, and homes during the holiday season. Follow up by asking if poinsettias are available at other times of the year. Pursue this vein of questioning by asking them why or why not.*

## Summary of Content and Teaching Strategies

**Objective I:** Discuss the history and importance of the poinsettia.

**Anticipated Problem:** What is the history and importance of the poinsettia?

- I. **Poinsettias** are closely associated with Christmas in the United States. The colors of the showy **bracts** or modified leaves include deep red, pink, white, speckled, and yellow.
  - A. The poinsettia plant is native to Mexico. United States Ambassador, Joel Poinset found the plant of interest and brought it to the United States in the early 1800s.
  - B. Poinsettias were grown primarily for use as cut flowers up through the early 1900s. Since then, poinsettias have become the number one selling potted flowering crop in the United States.
  - C. The major promoter and developer of poinsettia cultivars is the Ecke family located in California. Through their work and the work of others the quality of poinsettias has improved dramatically.
  - D. Poinsettias are both photoperiodic and thermoperiodic.
    1. **Photoperiodic** means they respond to the day length. Poinsettias will naturally initiate the formation of flower buds when nights lengthen to about 12 hours.
    2. **Thermoperiodic** indicates they respond to changes in the temperature. The initiation of poinsettia flowers is also influenced by temperature.

*Have the students read the appropriate sections in Floriculture: From Greenhouse Production to Floral Design. Have the students pursue additional information concerning the history of the poinsettia through the Internet. Lead a class discussion on the history of poinsettias. During the discussion cover general information regarding the crop including a review of photoperiodism and thermoperiodism. Require the students to take notes during the discussion. Use transparency masters TM: B1–4A for identification of a poinsettia and TM: B1–4B for identification of the parts of a flowering poinsettia. Use questioning to determine the level of student understanding of the topic.*

**Objective 2:** Describe how poinsettias are propagated.

**Anticipated Problem:** How are poinsettias propagated?

- II. Poinsettias are propagated asexually by stem cuttings.
  - A. Steps to propagating poinsettias follow:
    1. Take cuttings 3 to 4 inches in length, usually in late July.
    2. Treat the cutting with a medium-strength rooting hormone.
    3. Stick the cuttings and place under an intermittent mist system. The mist system permits higher light intensities, which help the plant make food for root development.
    4. Maintain rooting temperatures between 70 and 75°F.
  - B. Rooting of poinsettia cuttings takes 3 to 4 weeks.

*Assign the section regarding poinsettia propagation in Floriculture: From Greenhouse Production to Floral Design as a reading activity for homework or during supervised study. After the students have completed the reading assignment, discuss how poinsettias are propagated. If facilities for propagation are available, reinforce student knowledge by having them take and stick cuttings.*

**Objective 3:** Schedule a potted poinsettia crop.

**Anticipated Problem:** What is a growing schedule for a potted poinsettia crop?

- III. The schedule of a poinsettia crop can be divided into four main stages of production following potting.
  - A. Potting is vital to the success of the crop.
    1. Use well-drained growing medium with a pH between 5.0 and 6.5.
    2. Pot the poinsettias shallow in the medium to encourage healthy root growth.
    3. When using soilless medium, fill the pot to the top and firm gently, as the medium will settle.
    4. Drench with a fungicide to control root and stem rot.
  - B. The **vegetative stage** is a period when the grower encourages the plant to grow roots and leaves.
    1. Light the plants from 10:00 p.m. until 2:00 a.m. to simulate a long-day photoperiod.
    2. Fertilize at a rate of 300 parts per million nitrogen and potassium.
    3. Set night temperatures at 68 to 70°F and day temperatures between 70 and 80°F.
    4. Pinch the plants on September 10 leaving 4 to 6 leaves. **Pinching** involves the physical removal of the apical meristem of the plant. **Breaks**, which are branches that develop from lateral buds, form as a result of pinching. Raise fertilizer rates to 350 to 400 ppm nitrogen and potassium.
    5. Height of poinsettias can be controlled with application of chemical growth retardants up until the start of short day treatments. DIF is also effective.

- C. The **flower bud initiation stage** is the period during which the plants are encouraged to produce flower buds. It is usually started between September 20 and 25.
  - 1. Turn the lights off at night and provide short day conditions. Cover plants with black cloth if necessary from 5:00 p.m. until 8:00 a.m.
  - 2. Drop night temperatures to 62 to 64°F and day temperatures to 70 to 72°F.
  - 3. Lower fertilizer rates to 300 to 350 ppm nitrogen and potassium.
- D. The **flower bud development stage** or the phase during which flower buds develop begins around October 10.
  - 1. Stop black cloth treatment.
  - 2. Raise temperatures to 64 to 66°F at night and 70 to 75°F during the day.
  - 3. Fertilize at a rate of 300 ppm nitrogen and potassium.
  - 4. Drench with a fungicide to control root rot.
- E. The **flowering stage** is the stage when the bracts color and the flowers open prior to sale. It begins around November 15.
  - 1. Begin to finish plants by lowering night temperatures to 58 to 62°F to deepen the bract color.
  - 2. Reduce fertilizer rates to 200 ppm nitrogen and potassium.
  - 3. Once sleeved for shipping, plants should be kept at 60–65°F with no fertilizer.

*Prepare the students by having them read related sections in Floriculture: From Greenhouse Production to Floral Design. Require students to take notes on the major points presented in the reading. Follow the reading with a discussion on how to schedule and grow a crop. Have the students expand their notes based on the discussion. The discussion can also serve as a way to monitor students' mastery of the material.*

*Enhance the learning experience on how to schedule and grow a poinsettia crop by involving the students in the production of a crop. Have students perform tasks involved in production including the potting of cuttings, watering, fertilizing, adjusting temperatures, and controlling day lengths. Use LS: B1–4B to set dates and assign responsibilities for production tasks. Include industry people in the lesson. Set up a field trip to a commercial greenhouse that produces poinsettias and/or arrange to have a grower speak to the class about how to schedule a crop.*

**Objective 4:** Identify major poinsettia pests and disorders, as well as controls.

**Anticipated Problem:** What are major poinsettia pests and disorders and some means of control?

- IV. Poinsettias have a number of pests and disorders that require attention.
  - A. White fly is the number one pest problem. Other pest problems include mealy bugs, mites, thrips, and fungus gnats. The best control is to keep a clean, weed-free greenhouse and to have a well-planned pest control program.

- B. Poinsettias are very susceptible to root rot disease caused by *Pythium*, *Rhizoctonia*, and *Thielaviopsis* fungi. Well-timed fungicide applications and proper watering practices reduce these problems.

*Have the students read sections in Floriculture: From Greenhouse Production to Floral Design related to pest and disorders of poinsettias as homework or during supervised study. If the students are growing a poinsettia crop, help them set up a schedule for monitoring pest populations. Involve the students in managing the pests and disorders through approved practices. Use LS: B1–4B to re-cap important points covered in the lesson.*

**Review/Summary.** At the conclusion of the lesson, restate the student learning objectives. Focus the review of the material covered around those objectives. Call on students to explain the content associated with each objective. Use their responses as the basis for determining any areas that need re-teaching. Questions at the end of the chapters in the textbook may also be used in the review/summary. Use the school greenhouse to have students schedule and grow a poinsettia crop to reinforce student learning.

**Application.** Application can involve the following student activities using the attached lab sheets:

LS: B1–4A—Developing a Poinsettia Growing Schedule

LS: B1–4B—Growing Poinsettias Worksheet

**Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance during oral review of the material, application of skills in the greenhouse setting, completion of the laboratory sheet, and a written exam. A sample written test is attached.

## Answers to Sample Test:

### Part One: Matching

1=b, 2=f, 3=c, 4=g, 5=i, 6=a, 7=h, 8=d, 9=e, 10=j

### Part Two: Completion

1. stem cuttings
2. white fly
3. shallow
4. September 20 and 25
5. Ecke
6. Mexico
7. deep red, pink, white, speckled, and yellow
8. Joel Poinset

9. root rot disease
10. one

**Part Three: Short Answer**

Stage	Temperature	Day length	Fertilizer rate
Rooting	70–75°F	Long days	None
Vegetative	68–70°F	Long days	300 ppm N and K
After pinching	68–70°F	Long days	350–400 ppm N and K
Flower bud initiation	62–64°F	Short days	300–350 ppm N and K
Flower bud development	64–66°F	Short days	300 ppm N and K
Flowering	58–62°F	Short days	200–300 ppm N and K
Storage in plant sleeves	60–65°F		None

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# Test

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## Lesson B1–4: Growing Poinsettias

### Part One: Matching

*Instructions.* Match the term with the correct response. Write the letter of the term by the definition.

- |                                 |                     |
|---------------------------------|---------------------|
| a. breaks                       | f. pinching         |
| b. flower bud development stage | g. poinsettia       |
| c. flower bud initiation stage  | h. thermoperiodic   |
| d. flowering stage              | i. vegetative stage |
| e. photoperiodic                | j. bracts           |

- \_\_\_\_\_ 1. The phase during which flower buds develop.
- \_\_\_\_\_ 2. Involves the physical removal of the apical meristem of the plant.
- \_\_\_\_\_ 3. the period during which the plants are encouraged to produce flower buds.
- \_\_\_\_\_ 4. Potted plant that is closely associated with Christmas in the United States and has showy bracts colored deep red, pink, white, speckled, or yellow.
- \_\_\_\_\_ 5. A period when the grower encourages the plant to grow roots and leaves.
- \_\_\_\_\_ 6. Branches that develop as a result of pinching.
- \_\_\_\_\_ 7. Indicates they respond to changes in the temperature.
- \_\_\_\_\_ 8. The stage when the bracts color and the flowers open prior to sale.
- \_\_\_\_\_ 9. Means they respond to the day length.
- \_\_\_\_\_ 10. Modified leaves

### Part Two: Completion

*Instructions.* Provide the word or words to complete the following statements.

1. Poinsettias are propagated asexually by \_\_\_\_\_.
2. \_\_\_\_\_ is the number one pest problem of poinsettias.
3. Pot the poinsettias \_\_\_\_\_ in the medium to encourage healthy root growth.
4. The flower bud initiation stage is usually started between \_\_\_\_\_.

5. The major promoter and developer of poinsettia cultivars is the \_\_\_\_\_ family located in California.
6. The poinsettia plant is native to \_\_\_\_\_.
7. The bract colors of the poinsettia include \_\_\_\_\_.
8. United States Ambassador, \_\_\_\_\_, found the plant of interest and brought it to the United States in the early 1800s.
9. Poinsettias are very susceptible to \_\_\_\_\_.
10. Poinsettias are the number \_\_\_\_\_ selling potted flowering crop in the United States.

**Part Three: Short Answer**

*Instructions.* Provide information to answer the following questions.

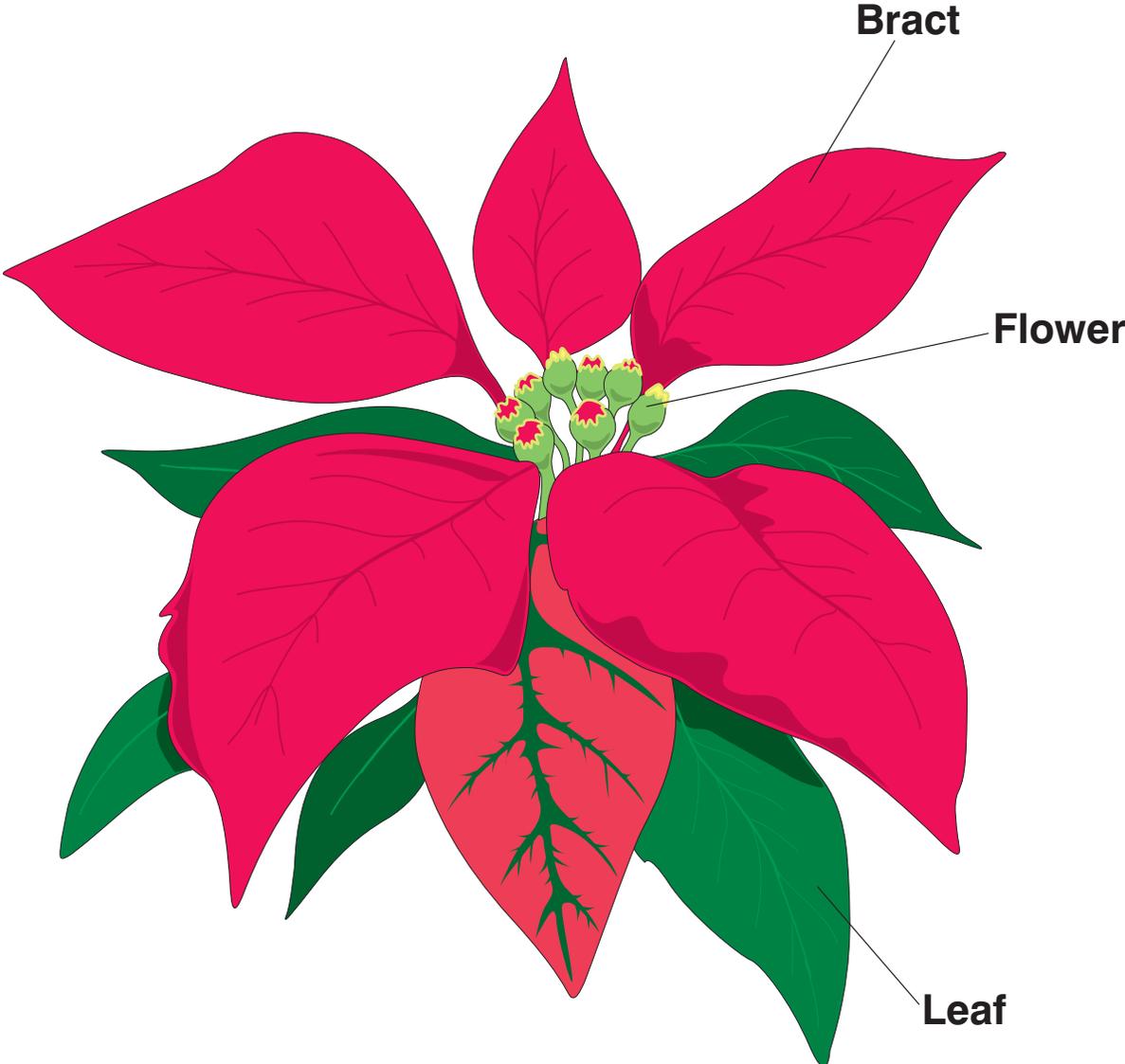
1. Complete the table below by entering the appropriate information in the three columns.

Stage	Temperature	Day length	Fertilizer rate
Rooting			
Vegetative		Long days	
After pinching			
Flower bud initiation			
Flower bud development			300 ppm N and K
Flowering			
Storage in plant sleeves		_____	None

**TM: BI-4A**



*(Courtesy, Paul Ecke Poinsettias)*



# Lab Sheet

## Developing a Poinsettia Growing Schedule

**Purpose:**

Students will gain a greater understanding of how to schedule a poinsettia crop.

**Instructions:**

Schedule a poinsettia crop using the table below and determine who will accept the responsibility for carrying out production tasks.

Stage	Date	Persons(s) responsible	Temper- ature	Day length	Fertilizer rate
<b>Rooting</b> 1. Sticking 2. Checking temperature			70–75°F	Long days	None
<b>Vegetative</b> 1. Potting 2. Drenching fungicide 3. Pinching 4. Watering 5. Fertilizing 6. Lighting 7. Applying Growth Re- tardants 8. Checking temperature			68–70°F	Long days	300 ppm N and K
<b>After pinching</b> 1. Watering 2. Fertilizing 3. Lighting 4. Checking temperature			68–70°F	Long days	350–400 ppm N and K

Stage	Date	Persons(s) responsible	Temperature	Day length	Fertilizer rate
<b><i>Flower bud initiation</i></b> 1. Watering 2. Fertilizing 3. Black cloth 4. Checking temperature			62–64°F	Short days	300–350 ppm N and K
<b><i>Flower bud development</i></b> 1. Watering 2. Fertilizing 3. Checking temperature			64–66°F	Short days	300 ppm N and K
<b><i>Flowering</i></b> 1. Watering 2. Fertilizing 3. Checking temperature			58–62°F	Short days	200–300 ppm N and K
<b><i>Storage in plant sleeves</i></b> 1. Packaging 2. Checking temperature			60–65°F		None

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# Lab Sheet

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## Growing Poinsettias Worksheet

**Purpose:**

Students will strengthen their understanding of poinsettias.

**Instructions:**

Complete the following.

1. Poinsettias are native to \_\_\_\_\_.
2. The \_\_\_\_\_ family receives much credit for developing the poinsettia industry.
3. Poinsettias are both photoperiodic and \_\_\_\_\_.
4. The photoperiodic response group to which poinsettias belong is \_\_\_\_\_.
5. \_\_\_\_\_ can be used to control the size of poinsettia plants.
6. Cuttings should be taken about \_\_\_\_\_ inches long.
7. Cuttings take \_\_\_\_\_ weeks to root.
8. Cuttings are placed under an intermittent mist system. The mist system \_\_\_\_\_  
\_\_\_\_\_.
9. Pot the poinsettias shallow in the medium to \_\_\_\_\_.
10. Until sometime between September 20 and 25, poinsettias are kept \_\_\_\_\_  
by lighting them from \_\_\_\_\_.
11. Poinsettias are \_\_\_\_\_ to promote branching, leaving  
\_\_\_\_\_ in the process.
12. Black cloth treatment can be stopped \_\_\_\_\_ when the flower  
bud development stage or the phase during which flower buds develop begins.
13. Finishing plants at lower night temperatures \_\_\_\_\_.
14. \_\_\_\_\_ is the number one pest problem.
15. Poinsettias are susceptible to soil-borne fungal diseases including \_\_\_\_\_,  
\_\_\_\_\_, and \_\_\_\_\_.

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# **Lab Sheet Key**

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## **Growing Poinsettias Worksheet**

1. Mexico
2. Ecke
3. thermoperiodic
4. short-day plants
5. Chemical growth retardants or DIF
6. 3-4
7. 3-4
8. permits higher light intensities, which help the plant make food for root development
9. encourage healthy root growth.
10. vegetative, 10 p.m. to 2 a.m.
11. pinched, 4-6 leaves
12. around October 10
13. deepens the bract color.
14. White fly
15. Pythium, Rhizoctonia, Thielaviopsis