

# Production Guide for *Campanula carpatica* as a flowering potted plant

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*Campanula carpatica* is a member of the Campanulaceae family, which includes over 700 species of annual, biennial and perennial plants. There are 300+ species within the *Campanula* genus, many of which have been popular garden plants for hundreds of years.

Some members of the genus are short day plants, some are long day plants and some are day neutral.

"Carpathian harebell" is one of the common names for *C. carpatica*, which is native to the Carpathian mountains of Eastern Europe. Carpathian harebell is hardy from zones 3 to 8, is very vigorous and has a long flowering season. The plant grows as a compact clump (9-12 inches in height) which is ideal for rock gardens or edging a flower bed.

The blue or white flowers are bell-shaped, face upwards and are held above the foliage. This attractive, showy plant is used extensively in perennial gardens in the United States and in Europe.

Carpathian harebells play another role in the world of horticulture — they are an important pot crop in Northern Europe and could easily be adapted to that use in North America. They provide the consumer with an attractive potted flowering plant, as well as an appealing, long-lived addition to the home garden since they can subsequently be planted outdoors.

Carpathian harebells respond strongly to photoperiod, which allows growers to control plant development and schedule flowering quite precisely.

## Cultivars

The most common cultivars in North America are 'Blue Clips', with medium lavender/blue flowers, and 'White Clips', with clear white flowers. A recent introduction is 'Deep Blue Clips', which has flowers of darker lavender/blue. 'Karl Foerster' has lilac-blue flowers and is grown extensively in Europe.

The following suggested production information is based on these cultivars and is not appropriate for other *Campanula* species.

## Propagation

Carpathian harebell can be propagated easily by cuttings or by seed. In North America, most plants are started from seed. Some seedling variation will be present, but available cultivars are quite uniform.

Light is required for germination, so the small seeds should not be covered.

Maintain medium temperatures at 68-72°F (20-22°C). Seedlings will emerge in 14-20 days. After germination, the photoperiod should be maintained at less than 14 hours to maintain vegetative growth.

An alternative is to purchase the seedlings, which are available from a number of plug producers.

Unlike some perennials, cold is not required for flowering, but plants in plug trays can readily be held in a cold greenhouse at 35-45°F (2-7°C) prior to transplanting to a finish container — often a 4 inch pot.

## Media and Nutrition

Use of a well-drained medium is especially important. Keep the medium evenly moist. pH should be maintained around 6.0.

Carpathian harebell requires moderate levels of fertility; constant fertilization at 100-150 ppm N from a balanced fertilizer is adequate.

## Spacing

The plants can be placed pot-to-pot after transplanting, until leaves begin to touch. Final spacing should be about 3 to 4 plants per square foot, depending on plant size at the start of flower induction.

## Temperature

Carpathian harebell is native to alpine regions and prefers cool temperatures. After germination, grow the plants on at 65-68°F (18-20°C). During forcing, it is best to lower temperatures to 61-68°F (16-20°C) since flower size will be smaller and plants will stretch if grown under higher temperatures.

## Light Levels

Provide full natural light intensity. Plant quality will be best under high light conditions. Supplemental lighting at 400-500 footcandles improves quality during the winter months.

## Flower Induction Requirements

Carpathian harebell is an obligate long-day plant. Under photoperiods of 12 hours or less, plants remain vegetative and form a compact rosette of leaves. Flower induction occurs when the photoperiod exceeds 14 to 16 hours.

After flower initiation has occurred and buds are visible, the buds will continue to develop even if the plants are subsequently placed under short days. The elongation associated with

long-day bolting will decrease, which results in a shorter plant.

“Limited Inductive Photoperiod” or LIP is a phrase that has been coined by Dr. Bob Lyons at Virginia Polytechnic University to describe the process in which plants are first exposed to long days for a limited period, then transferred back to short days for height control.

Although this technique can be adapted for height control of Carpathian harebell, it should be noted that it usually delays bloom time and reduces the number of flower buds formed. Schedules usually recommend maintaining the plants under long photoperiods until the time of sale.

At all stages prior to reproductive forcing, Carpathian harebell should be grown under short daylengths (less than 13 hours) to avoid premature floral initiation. Natural daylengths in late winter and early spring are ideal for this stage. This “bulking” time will result in more attractive plants with greater numbers of flowers at sale.

Long-day treatments can begin any time after the plants have 15 leaves. Long days (LD) can be provided either by extending the daylength to 16 hours, or by night-break lighting for 4 hours from 10:00 p.m. to 2:00 a.m.

Incandescent, high pressure sodium, cool white fluorescent and metal halide lamps are all effective. Minimum intensity should be 10 footcandles. When using incandescent lamps, about 1.5 watts of lighting per square foot of growing space is required.

## Scheduling

The time to flower after beginning LD depends on the forcing temperature.

Allow about 10-11 weeks at 59°F (15°C), 8-9 weeks at 64°F (18°C) or 7-8 weeks at 70°F (21°C).

## Height Control

Carpathian harebell is naturally quite compact, but a variety of cultural techniques can be used to control plant height. When grown at cooler temperatures, the plants tend to be more compact and additional height control may not be necessary. Plants grown under positive DIF conditions will be taller than those grown under 0 DIF or negative DIF.

The type of supplemental lighting used to provide LD will influence plant height. Incandescent lights cause more elongation than fluorescent due to the higher proportion of far-red light emitted by incandescent lamps.

Growth regulators can also be used to control height. Plants will respond to chlormequat (Cycocel) at a concentration of 1000-2000 ppm. Repeated applications at 10-12 day intervals may be necessary, depending on the vigor of the plants. Begin treatment about one week after the start of LD.

## Problems

Carpathian harebell is susceptible to damping-off or root rot caused by *Pythium* or *Rhizoctonia*. Use of a well-drained medium will help to reduce these problems.

Leaves may become infected by *Botrytis cinerea*, so it is helpful to keep the foliage as dry as possible.

Few insects are attracted to Carpathian harebell, but spider mites may become a problem.

## Postharvest Concerns

Conditions in the retail setting or the consumer's home are very different from those of the greenhouse. Water may not be provided regularly, and salt damage to the roots is a potential problem if the medium is nutrient-rich and allowed to dry out.

