



## Tubular Bells Series Penstemon

*P. hartwegii*

Approximate seed count (raw): 71,000 – 94,000  
S/oz (2500 - 3300 Sds/gr.)

### Key Flowering Facts

- First-year-flowering perennial (tender perennial).
- Photoperiod response: Facultative long day plant.
- Unique and attractive (early) summer item.
- Long flowering and heat tolerant.
- Eye-catching, great visual appeal.

### Plug Production

#### Media

Use a well-drained, disease-free, soilless media with a pH of 5.5 to 6.5 and an EC of 0.75 mmhos/cm).

#### Sowing

Sow 4 seeds per cell in 288 or 6 seeds per cell in 180 or larger plug tray.

Do not cover the seed.

Spray after sowing preventively against fungi.

**Stage 1** – Germination takes 3 to 6 days.

**Soil temperature:** 65 to 68°F (18 to 20°C)

**Light:** Light is not required but beneficial.

**Moisture:** Keep soil medium moist to medium wet (level 3-4).

**Humidity:** Maintain 95 to 97% relative humidity (RH) until radicles emerge.

#### Stage 2

**Soil temperature:** 65 to 68°F (18 to 20°C)

**Light:** Up to 2,500 f.c. (26,900 Lux)

**Moisture:** Reduce media moisture slightly to medium moist (level 3) to allow the roots to penetrate into the media. Don't let the media dry out.

**Fertilizer:** Apply fertilizer at rate 1 (less than 100 ppm N/less than 0.7 mmhos/cm EC) from nitrate-form fertilizers with low phosphorous.

#### Stage 3

**Soil temperature:** 60 to 65°F (16 to 18°C)

**Light:** Up to 2,500 f.c. (26,900 Lux)

**Moisture:** Maintain the moisture level constantly to medium moist (level 3). Avoid both excessive watering and drought.

**Fertilizer:** Apply fertilizer at rate 2 (100 to 175 ppm Nitrate fertilizer/0.7-1.2 mmhos/cm EC) from nitrate-form fertilizers.

**Growth Regulators:** Penstemon hartwegii is responsive to B-Nine/Alar (daminozide) 2,000 ppm (2.5 g/l 85% formulation or 3.0 g/l of 64% formulation) in early stage. Depending on weather a weekly spray is advised starting approximately 2 to 2½ weeks after sowing.

**Note:** PGR in plug stage is beneficial for uniformity but could delay crop time by 1 to 2 weeks.

#### Stage 4

**Soil temperature:** 60 to 65°F (16 to 18°C)

**Light:** Up to 5,000 f.c. (53,800 Lux) if temperature can be controlled.

**Moisture:** Same as Stage 3.

**Fertilizer:** Same as Stage 3.

### Growing On to Finish

#### Container Size

**1 gallon (17 cm):** 1-3 plugs per pot

**2 gallon (30 cm):** 3-5 plugs per pot

#### Media

Use a well-drained, disease-free, soilless media with a pH of 5.5 to 6.5 and an EC of 1.2 – 1.3 mmhos/cm).

**Vernalization:** Not required; Penstemon hartwegii doesn't tolerate frost and is a tender perennial.

#### Optimum Temperature

**Nights:** 50 to 59°F (10 to 15°C)

**Days:** 60 to 72°F (16 to 22°C)

**Note:** Growing Tubular Bells outdoor when frost free or in tunnels with cooler temperatures will give the best plant quality but could increase crop time by 2 to 4 weeks depending on season, temperature and light level.

#### Light

As high as possible. Low light intensity will make plants more stretching and soft, so additional light during winter or early spring will be beneficial.

### Photoperiod

It is a facultative long-day plant (long day beneficial) and flowers most rapidly and uniformly at 14 hours or longer day length.

### Irrigation

Keep media constantly medium moist (level 3). Root-system of Tubular Bells is very sensitive to too wet or too dry conditions. Avoid both excessive watering and drought.

### Fertilizer

Constantly fertilize at rate 1 to 2 (75 to 125 ppm/1.1 to 1.5 mmhos / cm EC) or apply 150 ppm N as needed.

Use a well balanced Nitrate form fertilizer including micro nutrients.

Avoid high ammonium and high nitrogen levels and also prevent for magnesium and Iron deficiency.

### Nitrate schedule from start to finish:

Start production stage	N = 1.1 – 1.2
Final production stage	N = 1.4 – 1.5

### Growth Regulators

Penstemon hartwegii is responsive to B-Nine/Alar (daminozide) in an early stage. An application of 2,500 ppm (3.0 gr/l 85% formulation or 4.0 gr/l 64% formulation) can be applied about 1 week to 10 days after transplant. If necessary, repeat the application after approximately 5 to 7 days depending on growth, temperature and light level. Low light and low temperatures may influence the reaction of the plant on the growth regulator.

**Note:** Penstemon hartwegii reacts best to plant growth regulator treatments in early stages (plug or just after transplant). The reaction will reduce to minimum approximately 4 to 6 weeks after transplant.

### Pinching

For pot-culture, pinching after 4 pairs of leaves could be done to get more flower stems; however, this will delay crop time approximately 3 weeks.

### Spacing

Space plants when foliage is touching.

### Crop Scheduling

**Sow to transplant (288 cell plug):** 6 to 8 weeks

**Sow to transplant (180 cell plug):** 7 to 9 weeks

**Transplant to flower:** 13 to 16 weeks

Under proper day length and temperature range using a 288 plug tray

**Total crop time:** 19 to 24 weeks

Under proper day length and temperature range using a 288 plug tray

**Note:** Larger plug size or bigger pot size may cause a slightly longer crop time of approximately one week.

**Production:** Sow early to middle of January for natural flowering in June under Northwest European conditions.

### Common Problems

**Insect:** Aphids, Spider Mites, White Flies, Thrips

**Disease:** Powdery Mildew, Leafspot

### Garden and Landscape Information

- Tubular Bells is a first-year-flowering perennial to USDA Hardiness Zone 7 to 10.
- Space plants 10 to 12 in. (25 to 30 cm) apart in well-drained soil.

**Note:** Growers should use the information presented here as a starting point. Crop times will vary depending on the climate, location, time of year, and greenhouse environmental conditions. Chemical and PGR recommendations are only guidelines. It is the responsibility of the applicator to read and follow all the current label directions for the specific chemical being used in accordance with all regulations.