

# Maximizing Easter Lily Bud Count

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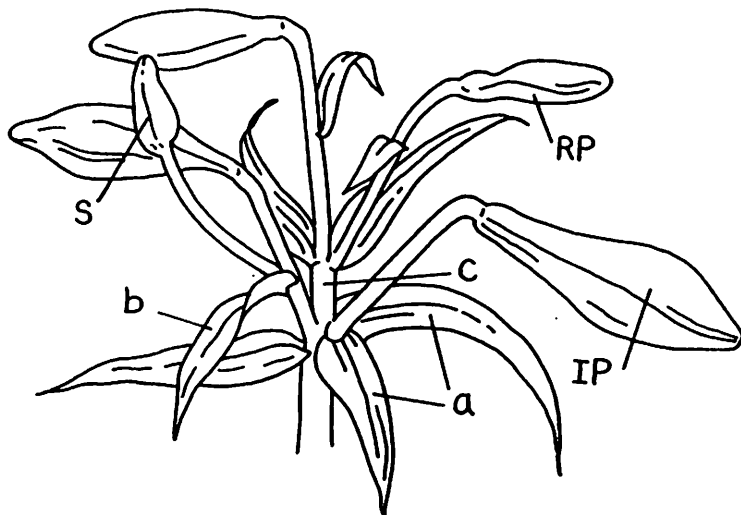
**T**he major factors influencing the final number of flowers a lily produces include cultivar, bulb size, bulb cooling method and length of cold treatment, greenhouse forcing temperature, and root development.

Flower initiation in Easter lilies begins after shoot emergence. Lilies are capable of producing three types of buds: initial primary buds, raised primary buds and secondary buds. With case cooled bulbs, usually only the primary buds are realized. With pot-cooled bulbs, naturally cooled or controlled temperature forced bulbs, secondary buds also develop.

The initial primary buds are large and produced in a whorl at the top of the plant. Raised primary buds appear in a whorl produced atop a flower stalk originating from the center of the initial primary whorl of flower buds. Secondary buds are borne in the axil of leaf bracts on the primary buds. Growers sometimes refer to these buds as bonus buds (see figure on page 10).

'Nellie White' and 'Ace' are the two most important cultivars used for Easter forcing. Both cultivars have been in the trade for many years. 'Nellie White' was introduced in 1955 and 'Ace' in 1935. 'Nellie White' accounts for about two thirds of the lilies forced for Easter.

In general, 'Nellie White' produces fewer leaves, less buds, and takes less time to force than does 'Ace'. The flower size of 'Nellie White' is generally superior to that of 'Ace". However, cultivar differences can vary considerable from year to year due to field conditions on the west coast where the bulbs are produced. Forcing a mixed crop of both 'Nellie White' and 'Ace' can be used as a hedge against the year-to-year variability which results from conditions in the field.



Lily with two initial primary buds (IP), two raised primary buds (RP) and one secondary bud (S). Also, leaf whorl on main stem under IP buds (a), bract on pedicle at base of S bud (b), and raised flower stalk for RP buds (c).

With both 'Nellie White' and 'Ace', larger bulbs generally yield larger plants with higher bud counts. Bulbs are graded and sold according to bulb circumference. A case will contain 250 7" to 8" bulbs, 200 8" to 9" bulbs, 150 9" to 10" bulbs and 100 10" or larger bulbs. The 8" to 9" bulb is a common size forced for Easter.

The forcing process begins as soon as the bulbs arrive. Growers can either case cool or pot cool their bulbs. Bulbs can be pot cooled naturally or in a controlled temperature cooler, usually referred to as CTF. Alternatively, commercially case-cooled bulbs can be purchased later in the season.

Regardless of cooling method used, Easter lily bulbs should receive no more than 1,000 hours (six weeks) of cooling before forcing. Some bulb cooling or vernalization must precede flower initiation. The number of hours bulbs are held at vernalizing temperatures will affect both number of days to flower and bud count. As vernalization time increases, forcing time decreases at the expense of bud count. This is the trade-off for the grower—rapid forcing verses high bud count! Over-cooling will decrease both bud count and forcing time.

Easter lilies forced from pot-cooled bulbs produce higher bud counts (as well as more leaves and longer leaves toward

the base of the stem) than do case-cooled bulbs. However, they may take a few days longer to force, require additional cooler space and must be cooled by the forcer. Case cooling requires less room in the cooler than does pot cooling and the job can be done commercially. However, case-cooled bulbs require greenhouse space during poinsettia season. Growers who case cool their own bulbs will usually find their plants superior to those case cooled commercially, since commercially case-cooled bulbs are sometimes overcooled, i.e. held at lower than optimum temperatures and/or for longer than desired periods.

With CTF, bulbs are potted and held at 63°F for three weeks (four on a late Easter) before cooling to allow root development to occur. Root development during this period results in higher bud counts later in the cropping cycle. After rooting, bulbs are cooled in the pot for 1,000 hours. Long-day or insurance lighting can substitute for cooling. However, excess lighting following shoot emergence will decrease bud count just as excess cooling does. Therefore, only use long-day lighting (insurance lighting) if you know or suspect that adequate cooling was not obtained or if bulbs emerge late. Provide one week of long-day lighting (10 to 15 fc from 10:00 pm to 2:00 am) for each week of cooling needed to reach the six-week total (i.e. substitute lighting for cooling on a one to one basis).

Once 1,000 hours of cooling have accumulated, greenhouse forcing begins. Bulbs are potted and held in the greenhouse at 60° to 63°F where shoots soon emerge. Primary bud initiation occurs when lily shoots are about 3" to 5" tall. During this period, maintain potting medium temperatures at 60° to 65°F. Do not let soil temperatures fall below 60°F or bud count and root development will be reduced, and do not allow temperatures to rise above 70°F or initiation will be delayed. Use tepid water for irrigation, as cold water will lower medium temperature and adversely affect bud development.

Once the primary bud initiation begins (usually around January 15 to 21), night temperatures can be lowered to stimulate secondary bud initiation (during week 11 or 12 in late January). Only lower night temperature after primary bud initiation has begun and **only** if lily development is ahead of schedule. Use 45°F night temperature for 'Nellie White' and 55°F for 'Ace'. Use 55°F for mixed crops for 10 to 14 days. After secondary buds have initiated (approximately February

1), raise the temperature to 65°F to stimulate bud development. Usually this warm-cool-warm technique can only be used on late Easters.

Healthy root development is the last important key to maximizing bud count. Roots are critical for water and nutrient uptake. In addition, healthy roots play a role in temperature perception during cold programming and the production of hormones essential for normal growth and development. Root rot diseases, physical root damage from rough handling, water stress (over- or underwatering) can all impair proper root function and, thus, affect flowering.

Once flower buds become visible, about six weeks prior to Easter, high temperatures, root damage and other plant stress should be avoided or bud abortion can result. From visible bud, lily flowers will reach the puffy white stage in four weeks at a temperature of 70°F and five weeks at a temperature of 63°F.

To maximize the bud count on your lilies this Easter, be sure to monitor lily development and adjust temperatures accordingly. Also, take care to limit stress during bulb handling and on roots during greenhouse forcing.

