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**Special Points
of Interest**

- The Bachman Chair is the only Horticulture Crop Marketing Chair in North America!
- Bulb Scale and Lily Leaf Counts for the 2000-2001 season!
- Useful summary tables showing registered pesticides, rates and family classifications.
- **NEW RESEARCH** on classification of annual species into appropriate photoperiodic classifications to aid you in determining how to get them to flower!

Todd and Barbara Bachman endow chair in horticulture marketing at University

The University of Minnesota has received a gift from Todd and Barbara Turnquist Bachman to create an endowed chair in horticulture marketing. Their gift will make it possible for the University to expand its teaching, research and outreach in developing the expertise for marketing horticultural products such as flowers and vegetables.

See the January issue of *MNLA News* for a complete article about this exciting contribution to the Department of Horticulture.

Commercial Flower Growers Bulletin Marks 50th Year

With this issue, the Minnesota Commercial Flower Growers Bulletin marks its 50th anniversary of providing research and education information to the region's flower growers. Started in 1951 as the *Minnesota State Florist Bulletin*, it has long been recognized as an important vehicle for sharing the latest scientific information with growers. It received the Professional Plant Growers Association Educational Media Award in 1993.

The founder and long-time editor of the *Bulletin* was Dr. Richard Widmer. Dr. Harold Wilkins was also a long-time contributor. Dr. John Erwin has been the editor for the past 10+ years and Dr. Neil Anderson and other members of the University's Horticulture Department are frequent contributors.

While the information is written, collected and edited by the University of Minnesota staff, printing and distribution of the *Bulletin* is currently paid for with private sector dollars. The Minnesota Commercial Flower Growers Association (MCFGA) paid for the *Bulletin* for many years. Beginning in 2000, the Minnesota Nursery and Landscape Association (MNLA) began paying for the *Bulletin's* production as part of the association's education outreach to members. It is anticipated that the MCFGA will finalize its assimilation into MNLA within the next two months.

Bulb Scale and Leaf Counts of Easter Lily, Lilium longiflorum 'Nellie White'

by Neil Anderson, Department of Horticultural Science, University of Minnesota

Introduction

By the time you receive this bulletin, the vernalization (cooling) treatment will have been completed on your Easter lily crop and greenhouse forcing/flower bud ini-

tiation are well underway.

Remember that Easter is late again, April 15, 2001.

Many factors are responsible for flowering your crop on time, as well as obtaining high bud counts. The number

of leaves is determined by hand counting after flower bud initiation has occurred on January 28th, 2001. This is the total number of leaves that

(continued on page 11)

(Leaf Count—continued from page 1)

must be unfolded prior to visible bud date. If you need a refresher on leaf counting, please consult the Easter lily production techniques contained in October, 2000, issue of the Minnesota Commercial Flower Growers Bulletin (volume 49, issue 3).

The number of desirable flower buds depends on your market, with bench-run lilies for mass markets having a standard of three (3) flowers/plant and higher-end retailing being five to nine (5-9) or more flowers/plant. Bulb size is one factor that affects the number of flowers, i.e. smaller bulbs have smaller growing points (meristems) and less flowers than larger sized bulbs. Most growers producing for the mass markets are using 7-8" (17.5-20 cm) bulbs with one plant/pot. Higher-end retailers use one 8-9" (20-22 cm) or larger bulb/pot or two 7-8" bulbs/pot.

The University of Minnesota has provided bulb scale and leaf counts for Easter lilies since Dr. Harold Wilkins, Professor Emeritus of Floriculture, initiated this research. The first report was for 1969. Since that time, we have enlisted the aid of undergraduate students enrolled in the potted plant production class (Hort 4051) to perform counts. Each year bulb scale and leaf counts vary widely, depending on bulb sizes and growing conditions in the fields prior to digging in October.

Bulb Scale Counts,

Easter lily bulbs consist of inner and outer scales, as well some leaves when they arrived at your greenhouse last

October. Outer bulb scales are those scales contained outside of the bulb perimeter from the last flower stalk (noticeable as a hole in the bulb). These outer scales are older that were submitted to 1-2 years of cold treatment in the ground during production. Inner bulb scales are those scales contained within the bulb from the last flower stalk. These inner scales are newer scales that have never had a cold treatment. Chemical inhibitors are contained in the newer scales that are responsible for slow emergence and growth, as well as flowering delays. It is due to the inhibitors that lily bulbs are given a six week cool, moist vernalization treatment.

We perform counts of inner and outer bulb scales, as well as the number of initiated leaves on bulbs during late October, prior to starting the vernalization treatments (case cooling or CTF--controlled temperature forcing). Inner scale counts provide an estimate on the level of inhibitors present in the bulbs. Table 1 (pg. 16) includes shows that the average number of inner scales is 47.6 and there were an average of 20.6 leaves present in the bulbs during October. The leaf count average for 2000 is 49.4, slightly higher than during 1999. If your bulbs were stored at the proper temperatures prior to cooling, provided your cooler does not malfunction (maintaining a constant 42F air/soil temperature), and no far-red lighting occurs (from incandescent lights), early emergence may be slightly less of a problem than last year.

Cooling and Growing On. The CTF vernalization treatment (rooted bulbs with

six weeks of 42F, moist conditions) should have started for most growers on Nov. 1st, 2000, with CTF lilies removed from the coolers on Dec. 13th, 2000. Case cooled lilies came out of the coolers approximately Dec. 15-22. Bulbs were brought into the greenhouse in mid-December, being grown at 65-67F air and soil temperature. **All shoots should have emerged by January 3, 2001.** Be sure to avoid any overhanging plants above the lilies as this will increase the far red:red light ratio at the plant level (creating longer internodes and taller plants).

Leaf counts.

After the end of the cooling period, during emergence and flower induction stages, maintain a soil temperature of 60-62F and an air temperature of 63-65F since Easter is late. Do not maintain soil temperatures of <60F as this may induce root rot and potentially could decrease flower bud counts.

Flower bud initiation occurs after emergence during the last three weeks of January, 2001. Plants will be approximately 3-4" tall at this stage. **As soon as possible on or after January 28, 2001, confirm the existence of flower buds and a total leaf count by dissecting the shoot apex (meristem) under a dissecting microscope.** FBI has not occurred if the shoot apex is dome-shaped. There should be noticeable bumps on the shoot apex (place a drop of colored ink on the shoot apex to help see the flower buds). Check five lilies for every 2,000 you have in production for FBI and average leaf counts (see the October, 2000, bulletin). Use this average number for

your leaf unfolding rate calculations with your crop.

The average leaf counts for 8-9" case cooled and CTF 'Nellie White' lilies during 1969-1999 are provided in Table 2 (pg. 16). On average, case cooled 'Nellie White' produces 75 leaves, while CTF produce 82 leaves. You must count the leaves in your lily crops each year, since bulb sources, bulb sizes, and growing conditions vary every year! Since flower buds have not yet initiated when this article was written, we cannot provide an average number in 2001 for your reference.

If you are growing 7-8" bulbs, remember that your leaf counts will be less than those listed in Table 2 and the plants will force faster. Likewise, 9-10" bulbs will have more leaves. With a late Easter in 2001, those of you growing 7-8" bulbs will want to have a slower leaf unfolding rate than with larger-sized bulbs to avoid reaching visible bud date too early. This can be obtained by lowering your average air temperature. Also, with larger-sized bulbs (9-10") you will need a slightly faster leaf unfolding rate to ensure you reach visible bud date on time. This can be obtained by raising your average air temperature.

Have a great Easter production season! Don't hesitate to contact your extension specialists (John Erwin, Ryan Warner) if you have any problems. Feel free to send your average leaf counts for case cooled and CTF lilies to Neil Anderson (FAX: 612/34-4941 or e-mail: ander044@tc.umn.edu) for inclusion in next year's data.

(continued on page 16)

(Lily Leaf Counts—continued from page 11)

Table 1. Yearly average counts of the number of inner and outer scales and leaves initiated during late October, prior to the commencement of vernalization, for 8-9" (20-22 cm) bulbs of *Lilium longiflorum* 'Nellie White'.

Year	Number of outer scales	Number of inner scales	Number of leaves initiated
1984	38.4	55.0	20.2
1985	38.4	45.3	25.7
1999	47.9	40.7	13.2
2000	45.2	49.4	23.4
Average	42.5	47.6	20.2

Table 2. Yearly average counts¹ of the number of leaves on case cooled and controlled temperature forcing (CTF) *Lilium longiflorum* 'Nellie White' plants (8-9", 20-22cm bulbs). Leaf counts were conducted as soon as possible after flower bud initiation, on January 28th (approximately) of each year.

Year	Case cooled	CTF
1969	---- ²	89.0
1970	89.6	90.5
1971	69.6	89.6
1972	70.2	90.0
1973	67.8	83.0
1974	80.0	87.3
1975	73.8	77.4
1976	71.9	82.3
1977	56.3	65.1
1978	65.6	74.5
1979	----	79.3
1980	----	69.7
1981	----	76.8
1982	----	70.8
1983	----	76.8
1984	----	83.2
1985	----	93.6
1986	87.2	84.1
1987	82.0	93.0
1999	85.2	89.4
Average	74.9	82.3

¹Counts from 1969-1987 are from H.F. Wilkins, Professor Emeritus in floriculture, University of Minnesota.

²Few, if any, 'Nellie White' Easter lilies were produced via case cooling during these years.

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