the poly coverings are replaced with 50% shade saran cloths for wind protection to keep the potted plugs from drying out.

The potting of all plugs is completed in September which allows new roots to become established before winter. Houses are recovered with double poly in mid-October. New root growth continues until mid-December, even without supplemental heat.

Supplemental heat is not used until approximately mid-February. Potted liners are frozen during the winter with a minimum soil temperature of 25°F. Because of snow cover, the greenhouses hold ground heat very well. When the heat is turned on, a temperature of 40°F is maintained at night. The sun heats the houses to 75°F during the day. As new growth appears, regular liquid feeding begins.

When new growth is about 3 to 4 in. long, we begin taking cuttings again. After the cuttings are removed, the flats are trimmed with the electric lawn mower. This trimming maintains a very compact, uniformly branched liner. Shipping of 2¼ in. potted liners begins May 1st and continues until mid-June.

CONCLUSION

Plug trays have made the propagation system at Spring Meadow Nursery flow from beginning to end. We like trays because they are sterile, in addition to being easy to carry, inventory, root in, and discard. It is a system with nothing left over at the end of the year. I have been in the nursery business for over 20 years and a member of the IPPS for 15 years. Many good ideas have come and gone. I like the plug tray system. If you haven't used it, try it.

DESCRIPTIONS OF EIGHTEEN TETRAPLOID *LOBELIA* CULTIVARS

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Since 1940, considerable data on the North American species and hybrids of *Lobelia* sect. *Lobelia* have been published by Bowden (3) and Bowden and Hirao (5). Some of the complex tetraploid hybrids that have resulted are excellent perennials for temperate-zone gardens. The parentage, ancestry, and history of these hybrids have been described by Bowden

(1,2,3). The colour plates of Bowden and Hirao (5) illustrate seven clonal selections.

The three gene pools of these complex tetraploids can be stated in taxonomic terms as: *Lobelia siphilitica* L. var. *siphilitica*; *L. cardinalis* L. subsp. *cardinalis* var. *cardinalis*; and *L. cardinalis* L. subsp. graminea (Lam.) McVaugh var. propinqua (Paxton) Bowden cv. Queen Victoria and cv. Illumination. While the original plants were diploid (2*n*=14), the tetraploids (2n=28) originated spontaneously in several hybrid populations or the tetraploids were induced by colchicine treatments of diploid plants followed by selfing and selection.

In 1962, I (Bowden) grew a large population of complex tetraploids at Ottawa, Canada. In 1967, 6 selected clones were sent to the Royal Horticultural Society's Garden at Wisley, England. The 6 clones were given the following cultivar names by the Wisley staff: Brightness, Cherry Ripe, Dark Crusader, Greensleeves, Red Plush, and Will Scarlet. In 1978 and 1979, I obtained rosettes of these 6 clones and grew them at Simcoe, Ontario. In 1979 and later, many intercrosses, selfs and backcrosses were made and large numbers of hybrid seedlings were grown. A few of the best clones were selected for testing

Table 1. Characteristics of leaves and stems of 18 *Lobelia* cultivars.

Cultivar	Parentage	Mature stem and leaf colours	Mature leaf-blade width, lower ½ of stems (cm)	Mature plant height (cm)
Brightness (=B)	orig. Ottawa Ont., Canada	green	3.0-5.5	108-136
Cherry Ripe (CR)	orig. Ottawa	green	2.9-4.4	55-131
Dark Crusader (DC)	orig. Ottawa	stem maroon; leaves green and maroon	3.5-4.7	60-84
Greensleeves (G)	orig. Ottawa	stem maroon below, green above; leaves green	3.0-4.2	50-121
Red Plush (RP)	orig. Ottawa	green	3.2-5.0	46-100
Will Scarlet	orig. Ottawa	stem maroon; leaves green and maroon	2.7-4.0	70-89
Simcoe	CR × B	green	3.5-6.0-(7.0)	85-115
Toronto	RP × B	green	3.7-5.4	70-132
Oakes Ames	RP × B	stem maroon to greenish; leaves green and maroon	4.0-6.8	84-139
Mexican Beauty	B × RP	green	3.5-5.8	97-134
Ottawa	B × RP	stem maroon; lvs. green and maroon	3.0-5.5	74-109
Canada	B × RP	green	3.5-5.2	94-130
James Pringle	B × RP	stem maroon; lvs. maroon and green	2.4-4.3	60-104
Ernst Benary	B × RP	green	3.2-4.8	90-136
Leslie Laking	B × RP	green	3.2-5.0	126-153
Monroe Landon	G × DC	green	3.0-5.5-(6.3)	90-157
Hamilton Dwarf	G (selfed)	green, some maroon	2.4-3.9	39-79
Wisley	G × CR	green	3.2-7.7	82-137

and propagation. Bowden (3) and Bowden and Hirao (5) listed some of the cultivar names. In Tables 1 and 2 are presented descriptions of the original six clones from Wisley and twelve of my newer clones. New seedlings and clones are being tested constantly. Bowden (3) classified and described these tetraploid clonal cultivars as *Lobelia* × *speciosa* Sweet (Canadian tetraploid group).

The descriptions of the 18 tetraploid cultivars have been written to conform to the articles and recommendations of the International Code of Nomenclature for Cultivated Plants (1980) and especially the instructions in Article 39 and Rec. 39A. Many kodachrome slides are available in my files. Numerous lobelia specimens listed in my earlier papers have been deposited in the Phanerogamic Herbarium of the Biosystematics Research Institute, Agriculture Canada, Ottawa (DAO).

The morphological characteristics of the 18 named cultivars are listed in Tables 1 and 2. The stems of all these clones are puberulous with dense short white hairs. In the last column of Table 2, the colours of the corolla-lobes were determined from the first edition of the Royal Horticultural Society

Table 2. Characteristics of racemes and flowers of 18 *Lobelia* cultivars.

Cultivar	Length of mature raceme (cm)	Mature sepal colour	Width of flower 3 corolla-lobes (cm)	Colour of corolla-lobes
Brightness	40-74	maroon, some green	3.0-3.5	blood red to orient red
Cherry Ripe	8-61	green and maroon	2.4-3.2	cherry; aged to rose red
Dark Crusader	13-23	deep maroon	2.0-2.3	ruby red; young fls. are redder.
Greensleeves	16-61	maroon	2.7-3.0	blood red to orient red
Red Plush	15-48	green and maroon	2.5-3.0	chrysanthemum crimson
Will Scarlet	19-31	deep maroon	2.5-2.9	blood red to orient red
Simcoe	18-54	green, some maroon	3.0-3.6	blood red to orient red; aged to crimson.
Toronto	20-49	green and maroon	3.1-3.8	chrysanthemum crimson
Oakes Ames	20-57	maroon; some green	3.2-3.6	blood red to orient red
Mexican Beauty	30-47	green	2.9-3.4	cardinal red; aged to chrysanthemum crimson
Ottawa	29-39	green and maroon	2.6-3.2	cardinal red; aged to chrysanthemum crimson
Canada	27-44	green and maroon	3.0-3.3	currant red to blood red
James Pringle	10-45	deep maroon	2.8-3.1	deep cardinal red
Ernst Benary	40-56	green and maroon	2.7-3.3	cardinal red; aged to chrysanthemum crimson
Leslie Laking	48-79	green	2.9-3.2	garnet lake (young); to beetroot purple; aged to deep lilac purple
Monroe Landon	27-59	green and maroon	2.8-3.4	doge purple; aged to royal purple
Hamilton Dwarf	12-20	maroon	2.0-2.8	blood red to orient red
Wisley	26-74	green and maroon	3.3-3.7	blood red to orient red

Colour Chart and the second edition was also consulted. Many of the corolla-lobe colours are the deepest tones shown on the colour charts and sometimes the colours are even more intense than the deepest tones of the charts.

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ALAN BUSH: Do you have any special overwintering techniques or do you receive a lot of snow cover?

ATHUR OSLACH: Our snow cover is not reliable, but in an average winter we will get snow. That is why I prefer not to move the plants in the fall. We mulch with straw in the fall. Put the straw on loose.

MICHAEL DODGE: Have you tried root cutting propagation? You would have more material available to you. Also, why are you not using *Lobelia cardinalis* 'Alba' or *L. syphilitica* 'Alba' to produce your whites?

ATHUR OSLACH: We are not using root cuttings. We have a large number of cultivars and produce them from rosettes. They produce anywhere from 7 to 8 rosettes per plant. We may use root cuttings with some of the better clones in the future. We have been into other colors and are just starting the white program.

PETER DEL TREDICI: I know that the diploid forms are short-lived in the garden; what about the tetraploids?

ATHUR OSLACH: The clones that we are working with, such as 'Wisley', 'Simco' and about 8 or 9 others, do not show the short-lived problem common to the species. We consider hardiness to be a more important problem for us in Canada.