

they are still not as perennial as we would like them to be in the hot humid eastern climate. However, I have had some in my own garden for five years so, with care, longevity can be induced. In the future there will be both red and yellow flowered delphiniums available; the best of these will have to be propagated by cuttings in order to maintain true stock.

PROPAGATION OF PERENNIALS USING KYES-KUBES

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In my talk I hope to show how we, at Spring Hill Nursery, use Kyes Kubes to advantage in the propagation of quality perennials for mail order shipment. The process of producing perennials with Kyes Kubes is not difficult and increases profits through reduced labor costs.

The K-4 Kyes Kube is a blend of natural peat moss with minor trace elements, wetting agent and starter fertilizer. It measures approximately 1 $\frac{3}{4}$ inches in diameter and 2 inches in height with a prepunched hole of $\frac{1}{4}$ in. diameter and $\frac{1}{2}$ in. deep.

We start by setting out the desired number of Kyes Kubes to be seeded and then water them in. During the process of watering we inject Banrot at 200 ppm. to kill any soil-born diseases; wetting agent is added to speed up the process. It normally takes 3 hours to water in 10,000 kubes. To fill in void areas between the kubes and aid in expanding root growth we peat down the kubes with Canadian peat so that the kubes have approximately $\frac{1}{4}$ inch of peat between them. The kubes are again watered to wet the peat and wash it down between the kubes, followed by a quick run over each flat with a pencil to repunch any filled holes.

The flats are now ready for seeding. We need basically two tools for seeding; a water fountain cup and pencil. Twice a year, winter and summer, we test our seed for viability and germination percentage. Depending on the perennial species and germination test results we decide how many seeds will be dropped into each kube. Normally 2 or 3 seeds are planted. The seeds are then covered with #4 vermiculite; normally the rule of thumb we use is to cover to a depth of $\frac{1}{2}$ the size of the seed. Exceptions are that we do not cover *Campanula* 'Blue Chip' or 'Crimson Coralbells'.

After sowing, the seeds are watered in and excess vermiculite is washed down between the kubes with a fine mist nozzle.

We germinate our perennials at 74° to 76°F on racks that are inside polyhouses. The racks are 5 ft. high and run the length of the 196 feet poly houses on each side with both racks holding 15,000 Kyes Kubes. Following germination and after the seedlings have their first true leaves they are moved to the floor and grown at 60°F to promote compact growth and harden off the foliage somewhat. Also, at this stage, they are fertilized with a 100 ppm solution of Peters 9-45-15 and Sequestrene 330 FE, followed up with an application of Osmocote 19-6-12 approximately two weeks later. This application of Osmocote carries us through the shipping season and assures us that our customer is receiving a well fertilized perennial.

QUESTION AND ANSWER PERIOD

RALPH SHUGERT: Brian Humphrey, in your talk this morning on the computer printout, does your computer also have the capability of costing each of the functions whether it be grafting, seeding, etc.?

BRIAN HUMPHREY: No.

RALPH SHUGERT: How then are you tracking costs on grafting?

BRIAN HUMPHREY: We do a manual costing system by recording time.

BILL FLEMER: Ed Mezitt, how does *Hamamelis* 'Arnold Promise' overwinter after you have rooted it?

ED MEZITT: We have had trouble with it but I think we have solved it. We have overwintered it satisfactorily, planted it out but lost it the following year. This year we are going to keep them in the greenhouse all winter and keep them growing with no rest period and that might be the answer.

RALPH SHUGERT: We produce a few plants. We root, pot and carry them the next winter in frames with standby heat that comes on at 30°F. In April we go to the field with the potted plants.

CARMINE RAGONESE: Michael Dodge, is there any breeding in the area of heat resistance with *Delphinium*?

MICHAEL DODGE: I really do not know. The species that are being used are annuals from warm climatic regions. They should bring heat resistance but I do not know if anyone is specifically breeding for heat resistance.

CARMINE RAGONESE: Mr. Mezitt, do you think you might have better results with propagation if you had a lower cubic volume greenhouse? It would help you to maintain turgidity better.

ED MEZITT: I think that would help.

MAT ZACK: Ed Mezitt, would your subirrigation method work with *Syringa* × *prestoniae* 'James McFarland'?

ED MEZITT: Yes. 'James McFarland' also roots well under mist.

GIL VASTINE: Ed Mezitt, with enough shade do you feel that your subirrigation method could be used outdoors?

ED MEZITT: Yes, give them enough to keep direct sunlight off. It is the hot sun that causes wilting.

VOICE: Ed Mezitt, I would like to ask you about the length of the cutting, hormone used, and if the crushed rock is sterilized.

ED MEZITT: We use Hormodin 3 and the crushed rock is not sterilized. The cuttings are selected at flowering.

DAVE TYZNIK: Ed Mezitt, what level of water do you maintain or how frequently do you irrigate?

ED MEZITT: We fill the pan the preceding day and then siphon it out before we stick the cuttings. After sticking we flood the cuttings overnight. We do not subirrigate again unless the cuttings wilt. Cuttings will not wilt for several weeks after the first subirrigation. We only leave 2 leaves and this may account for the low water loss.

STEVE STILL: You mentioned 3 genera in your talk that you have propagated. Are there others?

ED MEZITT: Yes, *Chaenomeles* and *Wisteria*. I think most anything will root.

VOICE: Ed Mezitt, you had lights over the cuttings, are they necessary?

ED MEZITT: We can find no advantage from their use.

VOICE: What type of container do you use to pot your lilacs?

ED MEZITT: A poly pot 3 × 5 inches.

VOICE: Richard Allred. When are you seeding your perennials in the Kyes Kubes?

RICHARD ALLRED: The slow growing types are seeded in mid-October to early November. Major part is seeded in late November to early December.

VOICE: You then have to go through the colder months and

use fuel. Could you start the plants earlier and carry them over at a colder temperature? If so, how would you do it?

RICHARD ALLRED: I have not tried that. I might store them at 35°F and then jump the temperature up in January.

VOICE: We germinate about 300,000 perennials in flats and transfer to 2¼ inch pots in the summer. In the fall we put them in cold storage and take them out for shipment in the spring.

DICK CROSS: Brian Humphrey, do you keep your *Juniperus* and *Picea* understocks on the dry side?

BRIAN HUMPHREY: Yes.

VOICE: We do it just the opposite. We wet the understock before placing them in the grafting case.

BRIAN HUMPHREY: That just shows that we must not be dogmatic when talking about propagation.

VOICE: What is the optimum temperature for spruce or pine graft callus formation?

BRIAN HUMPHREY: I would guess that they are low temperature response plants.

Tuesday Afternoon, November 28, 1978

The afternoon sessions convened at 1:30 p.m. with Joerg Leiss serving as moderator.

THE TREE FRUIT VIRUS-TESTED STOCK PROGRAM IN ONTARIO, CANADA

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Virus diseases of fruit crops are worldwide in distribution. Some of these diseases cause great reduction in yield and/or fruit quality. Others result in a rapid decline and death of plants; still others are much less dramatic in their effects but over a period of time take a steady toll. Because of this most of the major fruit producing countries in the world now have virus-tested stock programs.

In Ontario the first attempts at setting up a special block of virus-tested trees for budwood purposes was made in the late 1940's by Dr. G.H. Berkeley of the Plant Pathology Laboratory in St. Catharines and Dr. W.H. Upshall of the Horticultural Re-