We also intend to explore how shoots from the root pieces will root, as it has been our experience with genus *Malus* that rootability can be substantially enhanced by working with shoots from root pieces because these shoots are in a juvenile condition and do not have the physical barriers to root formation present in adult phase material.

Propagation of *Phlox paniculata* From Root Cuttings

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***Phlox paniculata* cultivars can be propagated by division and top and root cuttings. There is, however, a reason to use root cuttings over the other two methods and that is leaf nematodes and fungal diseases are propagated with the propagule while root cuttings are generally free of these pests.**

PROCEDURES

Currently Used Root Cutting Propagation Methods. Before starting I will discuss the different methods that are being used to produce plants from roots. The oldest is simply to dig plants close to the stems, leave most of the roots in the ground, fill in the holes, and then remove the plant sprouts from the ground when they can be handled. Proper labeling and space between cultivars is important to prevent mixing. Depending on the size of the mother plant, this method can yield quite a number of plants for little expense.

The next methods requires a heated greenhouse where temperatures can be maintained at 18 to 22C. Dormant 2-year-old plants are fall dug, retaining all roots, and cold stored until February. Then 1- to 2-mm root pieces 3 to 4 cm in length are planted with their proximal end up at a space of two roots per centimeter into rows 10 to 15 rows per standard flats. Depth of cover is 1 cm. David Beattie (Penn State University, University Park, Pennsylvania) describes a method where root cuttings are bundled and placed into 48- or 72-pocket trays without medium and placed into a grafting case at 68F. Sprouted cuttings are taken out and planted individually.

Another method is to spread the root pieces onto medium and cover with no more than 1 cm of propagation medium; it is best not to disturb the sprouts until at least the second or third leaf stage. The new shoots are very brittle and removing plants disturbs the remaining roots. While waiting for all the roots to develop shoots, the quick sprouting root pieces can be pruned to keep them uniform before transplanting.

With the advent of container growing we see roots becoming smaller and instead of growing down into the ground, circle the container — which end is up? I tried cutting the roots vertically and horizontally, but found that there were no differences in shoot production.

Research Results. I conducted some timing trials on the best time to harvest root pieces. I divided a group of container-grown phlox into three samples. The first group of dormant plants in 15-cm container were brought into the greenhouse, roots were cut into 4-cm slices, placed into a standard flat, and covered with medium. Yield was

75 to 100 plants. The second group had the same procedure repeated 4 weeks later with growing plants.Yield decreased to an average of 30 plants. The last trial date 4 weeks after the second, plants had eight to 10 sets of leaves on the growing plants and the result was two plants.

PERENNIAL PHLOX GROWN IN NORTH AMERICA

It surprises me that most North American catalogues only list more or less the same 8 to 10 phlox cultivars; is that all there is? I looked to see what is grown in Europe; *List of Names of Perennials* showed 136 *P. paniculata* cultivars and an additional 20 cultivars were found in *Hardy Herbaceous Perennials*. Powdery mildew is usually the worst disease of *P. paniculata*. At my location night temperatures are usually 8 to 10C lower than day temperatures and with very heavy dew there is no mildew. As an aside *P. subulata* often has downy mildew. When root cuttings developed shoots in the ground, new plants sprouted from the remaining roots and were clean.

Asexual Propagation of *Anemonella*, *Dodecatheon*, and *Trillium*

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INTRODUCTION

North American wildflowers are becoming increasingly popular with our customers. We try to offer named cultivars, double forms, and good color forms. Each cultivar must have uniform color, size, and form. Vegetative propagation is necessary since seed produces wide variation. Like most nurseries, Blanchette Gardens tries to grow plants to blooming size in the shortest possible time. This paper outlines a few methods, and how I have developed them to asexually produce flowering-size *Anemonella*, *Dodecatheon*, and *Trillium* fairly quickly.

PLANTS AND PROPAGATION

Dodecatheon. Shooting star is native to the United States. It has wide smooth leaves with a flowering stalk 10 to 30 cm high depending on the species. The nodding flowers can be white, lilac, magenta, red, or pink. They are primarily woodland plants that go dormant in the summer. While in active growth they enjoy a moist humus soil.

One spring, about 15 years ago, I noticed many flowering dodecatheon in a nursery container. The plants had been divided the previous August to single divisions and I couldn't imagine how one crown had produced so many. I quickly shook the plants free of soil to examine the roots. I found a long single root at the base of each plant with small roots starting to form around the crown. In August, I closely examined another crown and found small buds at the ends of most individual roots near the crown. I separated a few roots with these buds and replanted the original crown to evaluate in the spring. I found that each pot had a plant the following spring. Most were flowering size and each pot only had one plant including the large crown I