Propagation at Hanover Farms, Inc.©

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INTRODUCTION

Hanover Farms, Inc., is a regional groundcover nursery grower serving primarily the Mid-Atlantic States of Maryland and Virginia since 1984. We produce approximately 100,000 flats annually of *Hedera helix*, *Liriope muscari*, *Pachysandra terminalis*, and *Vinca minor*. Production is labor intensive involving the handling of some 4,000,000 plants annually as cuttings, divisions, liners, and plugs. As a production incentive, we make extensive use of piece-rate payment. All cuttings and tender rooted liners are housed initially in shaded houses that are humidified frequently, followed by decreasing humidification for later stages. Once hardened-off, these flats are then moved to finishing houses. Heavier liners, once potted, are placed in finishing houses without added humidification. All flats are moved around the nursery and shipped on our trucks on carts with the aid of forklifts. The price is constrained on groundcover products, and differentiation of the product is difficult. Consequently, proper handling and efficiencies in the operation become paramount to maintain profitability.

GENERAL METHODS OF PROPAGATION AND PRODUCTION

All propagated materials are grown in shade-covered houses. Shade percentages are typically 50%. We use intermittent mist for summer cuttings; otherwise, we use fog either from a high-pressure system from Baumac International or a fan-generated system from Jaybird Manufacturing. The high-pressure system is more uniform in distribution, but maintenance is expensive. The fan-generated system has areas of excessive fog that causes water saturation of some flats. There is also excessive water run-off with the fan system. Both systems are subject to winds and work best in closed or nearly closed houses. This can present problems in mid-summer when high heat loads are normal. Our intermittent mist propagation uses spinners on 3 m (10 ft) spacing down the center of the houses with lateral lines on the house periphery fitted with 180 degree heads on 0.9-m (3-ft) spacing. All three systems utilize timers for operational intervals. Our general aim is to minimize the amount of misting water or humidifier droplets necessary to get optimum rooting percentages.

We use piece-rate labor to produce cuttings and liners. In general we strive to have a single rate for each plant that involves its liner or cutting preparation, potting or sticking, and initial watering in. Each flat produced is tagged with the worker's initials and date produced thus giving us accountability for the individuals as well as a gauge of factors that affect the crops, independent of an individual. We feel that individual accountability is imperative when using piece-rate because the employee's motivation is quantity while our motivation is both quantity and quality.

Our propagation and production mixes are pine-bark based. If we wish better drainage we add perlite, up to one-third by volume. If we have soft stem cuttings and need to soften the mix, we add Metromix 360, approximately 30% by volume. While we incorporate fertilizers, micro-nutrients, and lime at recommended rates, we also

supplement with liquid feeding through our irrigation system with Peters 20N-20P-20K. We have found that incorporated fertilizers give very low soluble salt readings with our shallow flats. We use a Bouldin and Lawson mixer, flat-filler, and watering tunnel to prepare the flats.

We move the flats about on Cannon Equipment Co. carts that can handle up to 45 flats. Care must be taken as these carts will weigh up to 340 kg (750 lb) loaded. Our forklifts can move two carts at a time for a maximum total of 90 flats. All our polyhouses have concrete walks for rolling the carts. Additionally our trucks are sized to handle up to 16 carts. Weight constrains our shipments to 640 flats per truck.

***Hedera helix* Propagation**. We locally harvest or purchase English ivy (*Hedera helix*) runners, cut them with a sharp knife into single-node pieces, dip them in Woods rooting compound, and stick them into a perlite and pine bark mix. We use a Woods hormone dip (1 : 10, v/v). The node should be just at the soil surface for best result. We have found that ivy runners cannot have been subjected to prolonged winter weather or cutting death is increased. Lack of air circulation and high humidity in our growing houses in the winter also contribute to cutting disease and death. It is important to minimize the stress placed on freshly made cuttings until they are placed under mist or fog.

***Pachysandra terminalis* Propagation.** We locally harvest pachysandra (*P. terminalis*) cuttings directly from stock plant plantings, dip them in Woods rooting compound, and stick them into a pine-bark mix which includes perlite and Metromix 360. We use a Woods hormone dip (1 : 10, v/v) in warmer months and a 1 : 5 (v/v) dip in colder months. Again it is important to minimize the stress placed on the plants once they are made and until they are under mist or fog. Cuttings should be approximately the width of the cutter's hand in order to allow enough height above the surface of the flat to get adequate air circulation in the flat during rooting and subsequent growth.

***Liriope muscari* Propagation.** We field grow essentially all of our *Liriope muscari* for propagation. We begin with a single division or leafy and rooted crown that we pot in a 24- or 18-cell tray. We use a straight pine bark growing mix and Snapshot and Gallery herbicides for weed control in the flats. We want a large, firm division for best survival. Once potted, these plants will grow in our climate for anywhere from 3 to 8 months before they are ready to sell or transplant. The length of growing time depends mostly on the season in which they are planted. During the summer we field plant these small potted plants with a two-row Holland transplanter. We then begin a 3- or 4-year program of fairly intensive weed control and field fertilization. Weed control consists of both pre- and postemergent applications of herbicides. We use Surflan, Gallery, Manage, Roundup, Pennant, Princep, Finale, and other herbicides depending upon the weeds and stage of control. We also use hand labor. We apply fertilizers in the row with a side dress spring tooth harrow twice a year.

Once the plants have grown to a thirty to fifty division count to the clump, we will harvest using a two-row Fobro shaker-lifter. This process also requires a fair amount of manual labor to knock remaining dirt from the clumps in preparation for dividing. Division is accomplished using dexterous finger and hand action, knives, and brute force. Larger pieces of the rhizomes that lack leafy crowns are saved and planted later in shallow flats and beds to obtain additional plants.

***Vinca minor* Propagation.** We propagate *Vinca minor* primarily from collected liners. We find this to be one of the most difficult plants to grow consistently well. While it enjoys great market demand, it also demands much of our growers at the nursery. We obtain the liners either as clumps or loose bunches, which we assemble into small clumps of 2 to 3 stem counts. The appearance in the leaves of raised veins or dull color is indicative of loss of vigor and these plants are discarded. Once planted, the flats are watered in and moved to humidified houses where they are maintained under decreasing levels of humidity for about 3 weeks. They are then moved to finishing houses for an additional 3 weeks and are ready for sale. We use a pine bark mix with incorporated fertilizers and micro-nutrients and no lime. We pot up *Vinca* year round with the exception of a few weeks in April when the new growth is very tender.

CONCLUSION

While propagation of these groundcovers varies from plant to plant, they share many similarities in terms of growing media, flat sizes, handling methods, and growing periods. These factors contribute to production methods that utilize flat-filling equipment, piece-work incentive labor, and standard carts for transport in the nursery and shipping on our trucks. These factors result in cost savings and efficiencies that become especially important in a market that prices these goods as commodities.