

However, in a few moments I will discuss our fertilizer program in relationship to transplanting. As a bit of background, we build our soil with a green manure program, using cowpeas at the rate of one bushel per acre on all our fallowed ground. We are, also, fortunate being in a chicken broiler area, in that we clean out many chicken houses during the so-called 'slack' seasons. We believe we are receiving about 117 lbs. of Nitrogen, 96 lbs. of Phosphorus, and 77 lbs. of Potash per two tons of litter per acre, plus much humus advantage, during the plow-down of the manure. In general, most all plants, particularly evergreen grafts and slow-growing shade trees, are given a top-dressing of 12-12-12 fertilizer every winter. We do not fertilize at the time we plant our transplants, however, we will on occasion water in Broadleaf Evergreens with a Rapid-Gro solution, if the planting date is late in the spring. We are normally blessed with some open weather in Mid-January, and most all of our conifer planting is accomplished at this time. If weather causes us to plant in March or April, we will water in the transplants with water-soluble fertilizer. During the growing season, we use foliage fertilizer every time the spray rig leaves the barn. Our theory is that the machine and labor costs will be there anyway, and the small amount of the fertilizer cost (about \$5.25 per 400 gallons of water) is quite justified.

In summation, I would say all three subjects in this discussion could be important aids to successful transplanting. It goes without saying that no two of us will handle transplants in precisely the same manner, but we all know the importance of going to the field with the finest liner we can grow. We are all, I am sure, constantly trying to improve our techniques from year to year.

MODERATOR GALLE: Thank you, Ralph.

We are moving right along. We are now going to the panel on Hardening Plant Materials for Winter, and the first on the panel is Mr. Roland deWilde of Bridgeton, New Jersey.

HARDENING OF PLANT MATERIALS FOR WINTER (EAST)

ROLAND DEWILDE

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In considering this topic, I felt it wise to begin with a definition of the word "hardening." For the purpose of this talk, let's define it as "treatment of plant materials so as to promote the greatest resistance to damage from cold weather conditions."

There is no area in which we might find a greater difference of opinion and a smaller amount of scientific knowledge. We all know of times when things survived well and times when damage was great, and yet we cannot definitely state what caused the difference in results.

There are some measures we can take, which over the years have become standard practice. These might be divided into what might be termed "cultural practices" — and the things we do which might

be termed for want of a better term "mechanical practices."

Under "cultural practices" —

Plants should be grown well — with enough nutrients to obtain normal color, proper growth rate, and good wood formation. Over fertilizing — to the extent that growth does not harden well — is to be discouraged. Some types of plants — notably *Azaleas*, Rhodo's and *Ilex crenata*, can be injured severely by too much available Nitrogen in the soil late in the growing season. It is generally conceded that the available nitrogen should be balanced by an adequate supply of phosphorous and potash for proper wood formation. Experiments have shown that tomato plants grown in soils containing the higher levels of potash had greater resistance to frost damage. I believe that is true of woody plants as well.

We have found that a basic fertilization program on plants that are sometimes troublesome, is to feed a modest amount of a complete fertilizer tailored to the results of a soil test early in the Spring. The N in this mix should be at least 50% in a quickly available form, the balance in the slower organics. We like to think that this would be used up by late summer or earlier. At that time we try to put soluble fertilizers in the irrigation water. These are usually gone at the end of two weeks, so that an inspection of the plants can help to determine if another application is necessary. If hardening is slow, the potash in the solution may be increased and the N. decreased.

Under "mechanical" practices:

There are ways in which plant material may be hardened by lifting and transplanting, either to different areas or by resetting in the same block. We do this especially with *Azalea* liners. We used to have considerable trouble with stem splitting, especially on varieties such as *Indica alba*, but it can occur in all varieties if the first frost is severe enough. Lifting the plants and transplanting them has virtually eliminated this problem. It must, of course, be done before danger of frost is likely.

If crops are mulched, removing the mulch before frost is likely, will help to stop growth and will promote the escape of heat from the soil and the consequent raising of the temperature at the plant level.

Root pruning will tend to stop growth earlier, with consequent development of hardier wood, and less likelihood of damage.

In most cases, what the young plant needs is protection from sudden low temperatures. This can be done by covering with shades where practical and in case of late rooted cuttings by covering with sash. By opening the sash and airing whenever the temperature is above freezing, you can extend the time needed for the plant to adjust to cold temperatures.

MODERATOR GALLE: Thank you. You have noted that we have three men talking on the same thing, but it is in relation to different regions. Now we are going to the central area — almost at home. Mr. Collins of Cole Nursery, Painesville, Ohio.