

affected. Oryzalin at 2 $\frac{2}{3}$ lb/A provided very satisfactory control, while high rates of diphenamid, DCPA, and napropamide also controlled chickweed, but the use rates of these herbicides was higher than that recommended on the product label.

JAMES COARTNEY: Why did you not use a low rate of Princep which would be effective and enhance any of those materials?

PHILIP CARPENTER: The nursery wanted us to use the minimum amount of herbicide and we thought we could do without it. We have been very satisfied with Princep plus Surflan in the fall with very good results.

RALPH SHUGERT: Is there a reason why you did not use Kerb?

PHILIP CARPENTER: We primarily look at Kerb as a perennial grass killer.

RALPH SHUGERT: But it will work on chickweed at 2 lb AIA.

AN INEXPENSIVE METHOD OF DWARF SPRUCE PROPAGATION

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Dwarf spruce, such as *Picea glauca* 'Conica' and *Picea abies* 'Nidiformis', are slow growing conifers which are also slow to root from cuttings. To propagate these unique plants many methods have been used: summer-winter cuttings, grafting, mist, etc. We use a method which is easy to do, easy to maintain, takes no added heat, uses no misting, and the structure is economical to build. A cold frame with sash is used (no plastic) inside a shade house which has snowfence for shade covering (40% shade). The cold frame must have the sash absolutely tight fitting.

The rooting medium used is a sand-peat mixture with the fine washed sand (plaster type) put on a level bottom of top soil of a sandy nature, then the peatmoss is applied over the top of the 6 in. fine sand layer. The peat moss (2 in.) is watered and thoroughly mixed with the fine sand. The top of

the medium mixture, after leveling, should be about 4 to 6 in. from the sash.

Cutting maturity at harvest is very important. A good date in our area is approximately July 4th; however this may vary from place to place. Actually, the time is when the mother plants begin their second flush of growth. Cuttings taken too early result in basal decay.

Cuttings are gathered from field-grown plants (not from "old mamas"), dipped in water, and put in baskets which are kept under plastic in the cutting room. It is wise to gather fresh cuttings each day. They are stripped of the small branches but not needles, and made with a heel. The heel is trimmed to just below the basal buds with about $\frac{1}{16}$ in. of old (previous year) wood remaining on the base of the cutting. Too much old wood will cause failure, but no old wood will give basal decay.

No hormones are used. Dutch researchers ran many tests which showed that any method or combination of IAA, IBA, NAA failed to give better rooting than no hormone, and they sometimes retarded rooting.

Cuttings are 2 to 3 in. long and are inserted $\frac{1}{2}$ to $\frac{3}{4}$ in. deep in the propagation medium. They are fine-misted from time-to-time at the table where they are made and during sticking. Sash and white shade cloth are drawn over the cuttings as they are stuck. The cuttings are firmly packed with a hammer and 2 in. board. Row spacing is 2 in. apart and the cuttings are set $\frac{1}{2}$ in apart. They are thoroughly watered in at the end of the day. A sash area of 6 × 3 ft. holds approximately 2,500 cuttings. Moisture content is checked the next day. No further watering is needed during the summer. However, at 2 week intervals the cuttings are checked.

The white shade cloth remains over the sash until the summer temperature starts to drop in September, when most of the rooting starts to take place. The worst take we have had is 50%, the best 90%, and 75% is the most common take. A double layer of sash and some snowfence is put over for winter protection and heaving. In the spring the winter protection is removed, but the sash stays on and new growth begins rapidly ahead of the season. Some unrooted cuttings will still root even then.

When the first flush is hardened off, the sash is removed and the rooted cuttings are liquid fertilized every 10 days (a high nitrate, acid fertilizer). The rooted cuttings are left in the cold frame for two summers and are then planted with a 5-row bed planter at a 7 × 10 in. spacing. After two seasons in the bed they are sold as 10, 12, 15 in. lining-out material, contain-

erized, or planted out in the field. Another 2 years will give a 18 to 24 in., or 24 to 30 in. Alberta spruce, and a 12 to 15 in., or 15 to 18 in. nest spruce.

You will notice that this method took no flats or no small pots, as all plants were machine-planted in beds and in the field; no mist, no heat, no hormones, only time.

HENRY KOCK: What was your percent shade cloth?

DAVE BAKKER: I am not sure but we just buy bed sheeting by the yard and it will be the correct amount of shade.

PETER VERMEULEN: Could you give us some information on the age and size of your parent plants?

DAVE BAKKER: We learned that the hard way after setting up a stock block. The cuttings from the stock block did not root as well as when we take them from plants that are ready for sale that year.

Tuesday Evening, December 6, 1983

Mike Young moderated a group of presentations on grafting, including demonstrations. The following papers by Mike Young, Peter Vermeulen, Leonard Savella, and Tom McCloud were part of that session.

REVIEW OF GRAFTING

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Grafting is one of the oldest known forms of plant regeneration. References to it have appeared in writings for well over 2000 years. Over time it has become a valuable means of propagating many woody perennials as well as some herbaceous plants. Techniques in common use today are, in most respects, the same as those employed over the past several hundred years.

Grafting refers to the process of joining parts of two or more plants in such a way that they will unite and grow as one. The stock is the part of the new combination which will produce the root system and, occasionally with trees, the trunk as well. The scion is the part joined to the stock which will produce the top of the plant.