

at, I agree. We don't want to jump to conclusions on common effects, or nursery effects, or non-genetic effects.

VOICE: Question for George Edwards. Last year we had a number of seedlots of *Abies concolor* where any stratification would reduce the germination percentage quite a bit. Did you see such a variation in your studies from crop year to crop year?

GEORGE EDWARDS: Not with *Abies* although that kind of response has been reported in other species — in the East, particularly. In red pine and white spruce, I have noticed that stratification will — this is talking about collections from individual trees — behave this way. If you have four individual trees, tree A one year may respond well to stratification — that is, you get better germination but the following year seeds from that tree may not respond. Other trees will reverse their status, but some trees continue to maintain a good yearly response to stratification. Dormancy, using the term dormancy very loosely, does vary from one crop year to another. In terms of *Abies concolor*, you are talking about stratification bringing down the germination percentage. We have noticed that in a number of our seed lots stratification tends, as I mentioned earlier, to boost early germination. So the germination curve takes off in a hurry. But then it suddenly levels out — you don't get any further germination. So, a month or two months after you sow the seeds, you have actually fewer seedlings produced than from the unstratified seed. I am not sure there is a single or a simple answer to that situation. It has been related to disease — it could be physiological, but we don't understand it.

MODERATOR DOUG CHRISTIE: I would now like to introduce the next panel, speaking on the general subject of container production.

WEED CONTROL IN NURSERY CONTAINERS

GEORGE F. RYAN

*Washington State University
Western Washington Research and Extension Center
Puyallup, Washington 98371*

Several herbicides are available for use in nursery containers. Each one differs from the others in the weed spectrum it controls, the way it behaves in the container growing medium, and its tolerance by nursery plants.

One of the most useful of the chemicals now available is oxadiazon (Ronstar or Ornamental Herbicide I). It controls a broad spectrum of annual grass and broadleaf weeds, including bittercress (*Cardamine oligosperma*) which has been a hard weed to control either by hand or with chemicals. Oxadiazon is available only in granular formulations that should be applied when nursery stock foliage is dry to avoid leaf burn. The granules should be washed off thoroughly with irrigation before the foliage becomes wet with dew or light rain.

Control of annual grasses and some broadleaf weeds will be strengthened if oxadiazon is supplemented with napropamide (Devrinol) or oryzalin (Surflan). Common chickweed and mouseear chickweed, in particular, are not controlled by oxadiazon.

Another weed that oxadiazon does not control is birdseye pearlwort (*Sagina procumbens*), which has become a serious problem in containers during the past few years. Birdseye pearlwort is a compact mat-forming plant with linear leaves and numerous small greenish blossoms. It is closely related and somewhat similar in appearance to some of the *Sagina* and *Arenaria* species that are sold as Irish moss for use in rock gardens. Inadvertent propagation and sale of the weed species as Irish moss should be carefully avoided.

Our trials in 1980 showed that oryzalin controlled all three weeds, mouseear chickweed, common chickweed and pearlwort. Napropamide (10G) controlled mouseear chickweed and partially controlled common chickweed, but failed to control pearlwort. Nurserymen have reported control of pearlwort with napropamide. Our research on controlling this weed is continuing.

Both napropamide and oryzalin are tolerated by a wide range of woody ornamental plants in containers. They are particularly effective against annual grasses but also control a number of broadleaf weeds including pigweeds, lambsquarters and purslane. Oryzalin also controls oxalis, and napropamide partially controls common groundsel. Neither of these herbicides should be applied in combination with oxadiazon more often than once every 3 months.

A herbicide recently registered for use in dormant conifers is oxyfluorfen (Goal). It is especially useful because it controls common groundsel, preemergence or even after it is 3 to 4 inches tall. Goal should be used only on the conifers listed on the label, before growth starts in the spring or after the new growth hardens off.

Another herbicide for use on holly and juniper species in containers is the granular formulation of alachlor (Lasso II). It

controls annual grasses and some of the same broadleaf weeds that are controlled by oryzalin and napropamide. As with oxadiazon it should not be applied to wet foliage and the granules should be washed off within a short time after application

Other herbicides such as DCPA (Dacthal), diphenamid (Enide), and pronamide (Kerb), though not registered specifically for use in containers, are tolerated by a wide range of ornamentals. They control annual grasses and some kinds of broadleaf weeds, including the chickweeds, and may have potential for use in combination with oxadiazon

All of these herbicides are primarily for preemergence application to control weeds as they germinate or emerge from the soil. Oxyfluorfen does give some postemergence activity but its most efficient use is as a preemergence herbicide. Pronamide controls established perennial grasses and also controls grasses preemergence. Research continues on control of weeds after emergence, particularly on the pearlwort problem.

The use of herbicides should be combined with whatever hand weeding is necessary to control weeds which escape the treatments, and a general program of maintaining the nursery as free of weeds as possible will help to reduce contamination of the containers with weed seed

If a soil mix contains weed seed, fumigation or heat treatment will eliminate much of the weed problem initially. With an unfumigated mix containing weed seed, herbicides should be applied as soon as possible after transplanting and settling of the medium in the container. Even a container that starts out free of weed seeds will be contaminated by wind-blown seed within a few weeks, and herbicides should be applied in anticipation of the problem before germination and weed emergence starts.

USE OF OSMOCOTE IN CONTAINER GROWING

BEVERLEY R. GREENWELL¹

17720 57th Avenue
Surrey, V3S 4P9
British Columbia, Canada

The base of a soil mix is very important in successful container growing. The mix needs to have a high water holding capacity, with sufficient porosity to give rapid drainage

¹ Nursery Specialist, B C Ministry of Agriculture and Foods