

GARY TAYLOR: Subdue or Ridomil are systemic but must be used as a drench.

CHARLIE PARKERSON: It seems to me that the rates of lime reported at this meeting are much lower than at other times.

GARY COBB: I feel very well satisfied with 6 lb./yd.<sup>3</sup> We have found that most plants will do very well with rates varying from 2 to 15 lb./yd.<sup>3</sup> Boxwood, however, seems to need the heavier rates.

TOM LETT: We are adding nothing to our peat:perlite mix.

BRYSON JAMES: Water in your area probably contains a large amount of calcium.

DON COVAN: We have found that our water can supply one ton of calcium per acre over one year's time.

## **SPRAY PROGRAMS AND EQUIPMENT**

BRYSON L. JAMES

BRY-J Farms and Services

P.O. Box 230

McMinnville, Tennessee 37110

Safe and effective spray programs require good equipment, frequent careful inspection of plants, knowledge of pests and chemicals, and accurate records.

We do not have time nor the knowledge to give specific programs to fit all nurseries or all potential pest problems. However, we will offer some generalized examples based on experience gained in custom application and in consultation with many of the best nurseries in the South.

Many nurseries do not have effective spray programs because they do not have proper equipment or do not maintain equipment properly. We will discuss types of sprayers later but should mention here that protective clothing should be considered as necessary spray equipment.

## **GENERAL SAFETY INSTRUCTIONS**

Anytime we discuss pesticide spraying we like to review briefly safety procedures.

- Read the label, *before using*.
- Know the pest.
- Use pesticides only when needed.

- Know what to do in case of an accident.
- Take time to explain safe use of pesticides to all employees so they will understand re-entry instructions and safe handling of treated plants.
- Check application equipment for leaks, clogged nozzles, strainers, or liners.
- Check respirator, gloves, and protective clothing frequently.
- Calibrate equipment frequently, using water.
- Never eat, drink, or smoke when handling pesticides or afterwards without first bathing thoroughly.

### TANK MIXES AND PESTICIDE COMPATIBILITY

We generally use tank mixes of two or more pesticides in the spray tank at time of application. This way we effectively control both insects and diseases with one application. Some products give tank-mix instructions on the label; others are recommended by the Agricultural Extension Service or are common agricultural practice. If products you wish to tank mix do not fall into one of the above categories, their use still will not be deemed inconsistent with label if:

1. The products in the mix are applied at a dosage rate not to exceed the label instructions for use of any product in the mix used singly for the same set of pests on the same crop, and
2. The label on one or more of the products does not explicitly instruct against such mixture.

Any mixtures not on labels are applied at the user's risk with respect to effects on crops and equipment, applicator safety, and environmental effects. All the tank mixes we list later have been used many times with safety and effectiveness. Should you desire to mix products of unknown compatibility, mix proportional amounts in a gallon jug, shake vigorously, and let stand. If no gunk or sedimentation occurs, the mixture should be all right. The annually revised "Spray Compatibility Chart," published by the Meister Publishing Co., is helpful.

### GENERAL INSECT AND DISEASE CONTROL PROGRAM

Our records and observations show that at least 4 or 5 sprays will be needed in a general line of nursery stock every year.

1. Dormant season spray: Apply when temperatures are not expected to be below 40°F nor above 80°F.

— Tank mix superior spray oil, Orthene, acephate; and Fermate (Carbamate), ferbam. Add oil to tank last, after thoroughly mixing the other two products with water.

2. Early spring flush spray: Tank mix Lorsban or Dursban, (cloropyrifos); Benlate (benomyl); and Dithane M-45 or Manzate 2000, (mancozeb), and a spreader-sticker.

3. Late spring, 4 to 6 weeks after No. 2: Tank mix Supracide, (methidathion); and Funginex, (triforene).

4. Summer spray: Tank mix Orthene and Daconil 2787 or Bravo, (chlorothalonil); and a spreader-sticker.

5. Early September: Tank mix Lorsban or Dursban and Dithane M-45 or Manzate 200 and a spreader-sticker.

Please note that the above are general guidelines. More frequent application often is needed for specific pest problems. When a particular pest is identified, choose a pesticide specific for that pest. Foliage plants, azaleas, Fraser photinia, and greenhouse crops usually require much more frequent spraying than the general line of woody ornamentals.

### GENERAL WEED CONTROL

For field nurseries make at least two applications per year of preemergence herbicides.

1. Fall, (October-December).

a. Needle evergreens: Tank mix Goal (oxyfluorfen); and simazine.

b. Broad-leaved evergreens, deciduous stock and needle evergreens: Kerb, (pronamide); or Surflan, (oryzalin).

2. Spring (April-May).

a. Needle evergreens: Goal, or simazine, or tank mix the two.

b. Broadleaved evergreens, deciduous stock, and needle evergreens: Surflan.

Some years and at more southern latitudes a summer application may be desirable. Where needed, use Surflan.

Spot treat perennial weeds and grasses and others not controlled with the preemergence herbicides.

For general broadleaf weeds and grasses — Roundup, (glyphosate).

For nutsedge — Basagran, (bentazon), or Roundup.

For grasses only — Poast, (sethoxydim), or Fusilade, (fluzifop-butyl).

Herbicides for container weed control are seldom sprayed,

but we will give you our thoughts below on the granular products available:

1. Apply, every 10 to 12 weeks during the growing season.
2. Don't use the same product for every application but alternate with at least three products. Choices include Ronstar, oxadiazon; Scotts OH II, (oxyfluorfen plus pendimethalin); Rout, (oxyfluorfen plus oryzalin); Treflan, trifluralin.

### EQUIPMENT

You cannot apply a pesticide properly or safely without the correct equipment. We apply everything except postemergence, contact-type herbicides with a mist (air-blast) blower.

Not all air-blast sprayers are suitable for nursery stock. We tested and had demonstrations with many makes before finding one that did the job we liked.

### SPRAY COVERAGE

Many do not understand how or why better coverage and control of pests is obtained with low volumes of spray solution applied in an air blast than with conventional hydraulic sprayers. If you will remember that air is the carrier with air-blast spraying, it is easy to understand better coverage. Conventional sprayers frequently use 100 to 500 gal./A of water as a carrier. At our top spraying speed we use more than 700,000 gal./A of air as a carrier. At slower speeds even more air/acre is used. When properly atomized, spray solution goes everywhere the air goes.

It is important to regulate tractor speed when spraying plants with dense foliage to insure good air turbulence. To get good coverage on the underside of leaves of low-growing plants, direct the air-blast slightly downward to create bounce-back or a ground roll of air.

### SPRAYER VERSATILITY AND ECONOMY

If you choose a sprayer carefully, one is enough for all field spraying, from container to large trees, with insecticides, fungicides, and herbicides. Following are some features to consider:

— Pumping capacity should exceed total nozzle output by 10 gallons per minute (gpm). To insure good by-pass agitation at all times, 5 gpm is a minimum.

— Type of pump can make a difference in maintenance costs. We find that diaphragm pumps are least affected by abrasive or corrosive chemicals. Roller pumps are the least desirable. Piston and centrifugal pumps are acceptable but not

as trouble-free, nor as easy to repair, as the diaphragm types.

— *Maneuverability* is important, especially for the smaller or highly-diversified growers. We like 3-point hitch better than pull types.

— Blower capacity should be adequate to create turbulence to the top of trees and laterally to the full width of areas to be sprayed.

— *Air-blast directional control* is important to maximize spray in the target area and minimize drift.

— *Fan disconnect* feature is desirable when mixing chemicals.

— Easy calibration and rate changes eliminate guesswork and maximize safety and efficiency.

— *Speedy application* is important economically as well as practical. A job that can be done quickly is more likely to be done on time. Conditions usually are not favorable for spraying 24 hours per day. We spray an acre of large plants in about 5 minutes.

— *Easy cleaning* features reduce the potential for neglect and clogging problems.

— *Hose and hand-gun or boom spraying connections* should be possible. This will eliminate the need for another sprayer for directed sprays and band spraying or spot spraying for special situations.

— “*Reasonable price*” is a relative term. By comparison, we think the \$5300 machine we prefer is reasonable because it has all the features above, and more. Our second choice is a sprayer that we have used one season and like. It costs under \$4000. Both of these air-blast sprayers compare favorably with \$7- to \$15-thousand sprayers we have tried.

Please contact me if you would like more detailed information on this equipment.