they can and try a few, very few, grow bags on several plant species to observe for themselves. Do they perform well in your soil types? Do they dig easily? Can they be dug safely during the off-season? Will your clients buy them? How do costs compare with your present system?

Containerizing or boxing field-grown plants still are the best growing procedures for providing large trees for off-season sales. With proper care, most species can be harvested safely with a tree spade during the off-season, especially if they were root pruned at least one time after planting into the field.

SUMMARY

Grow bags are still in the early stages of development but are being promoted as a finished and proven growing and marketing system. We sincerely *hope* solutions to most of the many problems will be found before the "Grow Bag Ship" sinks so deeply that it cannot be refloated. At the present, grow bags are not all we had hoped for.

FUNGICIDES USED IN PROPAGATION AT FLOWERWOOD NURSERY

BUDDY MOTLEY

Flowerwood Nursery, Inc.
6470 Dauphin Island Parkway
Mobile, Alabama 36605

Flowerwood Nursery is using several different fungicides for different fungus problems. Our fungicide program begins before we take the cuttings. It is necessary to start off with clean, fungus-free stock plants. The cuttings' first fungicide treatment begins right after they have been cut. They are dipped for 15 to 20 minutes in captan 50 WP mixed at a rate of two pounds per 100 gallons of water, with no sticker. This is the manufacturer's recommended rate. The cuttings are still in the burlap sack where they were placed directly after cutting. After soaking they are spread out on tables under light mist until they are ready for planting.

Our second step of fungicide use is spraying right after the cuttings have been planted in the propagation beds. This is done every seven days as a general spraying. It is done in the afternoon 30 to 40 minutes after the mist clocks have been cut off. We wait this long to allow the cuttings to dry before spraying. We spray with a Bean 200-gallon, 8-hp sprayer mounted on a half-ton pickup truck frame. This makes it easy to drive down the center of the greenhouses.

The fungicide we use is Benlate, prepared at a rate of 1 lb. per 100 gallons of water. With this spraying, we use a sticker, Nu-Film, at a rate of ½ cup per 100 gallons. Benlate is a systemic fungicide, which takes two to three hours to react. Benlate, as is the case with all fungicides, will not cure the problem but only control and prevent further fungi infection. We have found Benlate to be safe on almost all ornamentals at the rate of 1 lb. per 100 gallons. We do not spray Benlate on *Juniperus horizontalis* 'Bar Harbor' because of suspected toxicity. (This is only *our* opinion.) The next week we spray with captan 50 WP at the rate of 2 lbs. per 100 gallons of water, plus the ½ cup of Nu-Film. We alternate spraying because excessive use of any one fungicide may lead to buildup of resistant strains of fungi and loss of disease control. The reason we use only the two, Benlate and captan, on unrooted cuttings is that we have found them to be safe on a large number of ornamental crops.

Spraying is done with a hand-held boom, spraying over the top of the cuttings and letting the spray mist fall evenly over the cuttings. This technique keeps the pressure from blowing the unrooted cuttings to one side or out of the pots.

The next step in our fungicide program is routine spraying every 10 to 14 days. This is for rooted cuttings. We use the 200-gallon Bean or a 500-gallon Swanson blower sprayer. The Swanson blower sprayer is powered by a 132 hp tractor with an output of around 103 gallons per acre. We use a variety of fungicides for alternate sprayings every 14 days. Following is a list of these fungicides and the rate we use to mix them:

Daconil 2787 WP. We use this at the rate of 1½ pound per 100 gallons water. Fungi it helps prevent includes leaf spot, powdery mildew, phytophthora, and blight. We have found it safe on all rooted ornamental cuttings. We do not use it on unrooted cuttings.

Manzate 200 WP. Spray rate is 1 lb. per 100 gallons water plus one cup Nu-Film. Use this for highly effective contact control of stem and crown rots, alternaria blight, phytophthora leaf spot, and rhizoctonia blight.

Subdue. This is a systemic. Used as a drench at the rate of 2 oz. per 100 gallons of water for control of root disease. Also used as a spray on azaleas at the rate of 1¼ oz. per 100 gallons for control of pythium, phytophthora, and other water-mold diseases.

Ridomil. Also used as a drench at the rate of 4 oz. per 100 gallons water. This is the same as Subdue but may vary in price.

Triforine EC liquid. Rate of 12 oz. per 100 gallons water. We use Triforin mainly on *Photinia fraseri* for control of leaf spot, repeating every 14 days or as needed to maintain control. It is also good for powdery mildew with no mildew resistance.

Banrot. As a drench at the rate of 1 lb. per 100 gallons water. We use it to control damping-off root and stem rots and diseases caused by water-mold fungi.

Zyban. For a broad spectrum systemic and contact control of anthracnose, leaf spot, powdery mildew, and stem twig blight. Spray rate of 1½ pounds per 100 gallons water with ½ cup Nu-Film.

Kocide. For control of bacterial spot on *Euonymus japonicus*, var. *aureo-marginata* 'Aureomarginata'. Rate of 1½ lbs. per 100 gallons water plus ½ cup Nu-Film.

All of the fungicides and the rates as listed above have been working for us in our fungicide spray program. Most of these are available under other trade names. The important thing is the active ingredient, which is given in Table 1. We also use the "shotgun" approach. This means you see a problem, you identify it and then use the recommended fungicide for that particular fungus.

Spraying uniformly over the area with a boom-type sprayer insures good coverage and good control by your fungicide. On unrooted cuttings we spray over the bed almost to runoff, then mist.

Last but not least—safety first. Know your fungicide. Read the label, even the small print. Check your equipment for leaks, clogged lines, clogged nozzles, and clogged strainers. Calibrate your equipment frequently for proper output. Wear respirators and protective clothing.

Table 1. Active ingredients of fungicides used.

Common name		Active ingredient
Benlate	—	benomyl
Banrot	—	etridiazole + thiophanate methyl
Captan	—	captan
Daconil	—	chlorothalonil
Funginex	—	triforine
Kocide	—	copper hydroxide
Manzate	—	maneb
Ridomil	—	metalaxyl
Subdue	—	metalaxyl
Zyban	—	mancozeb + thiophanate methyl