Update on Fiber Pot Research at Penn State: The Plantable Pot©

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Fiber pots have been used almost as long as plants have been container-grown. Until recently, however, the fiber pot has only been considered a temporary or seasonal container for landscape plants. Subject to bacterial and fungal breakdown, these pots, depending on the ambient temperature and moisture conditions, could only be counted on for a few weeks to a few months. Incorporating copper into the fiber matrix has improved seasonal strength and longevity. We now know that we can customize the life of the container to meet the needs of the grower by incorporating more or less copper. If no copper is incorporated the pot may only last weeks, whereas increased copper content will extend the container life to many months, even years. Although the copper is added to lengthen pot life, it does have the added advantage of altering root growth, particularly reducing encircling roots.

Fiber containers have many cultural advantages, including lower medium temperatures, and higher medium aeration. Even with copper incorporated into fiber pots, they eventually break down. This provides the potential for potting the plant directly into the landscape or into the next phase of production without removing it from the container, thus saving time and the need to dispose of the pot.

In Spring 2000 we began a series of trials to determine if the fiber pots with holes can be planted, and how this technology might be used by nurserymen and landscap-

Figure 1. Roots emerging from untreated pots.

Figure 2. Emergence of roots through openings in side walls of copper-treated pots.

ers. Some nurseries grow potted liners that are planted to the field, while a container grower might transplant a pot-grown liner into a larger container. If fiber pots are to be planted, roots must leave the pot and enter the surrounding soil or medium, so one of two things must happen. Either roots must go out through the pot side-wall, or the pot must disintegrate, effectively removing the barrier. If copper fungicides are incorporated into pots to reduce breakdown –and we know that copper effectively truncates root elongation – then roots must grow outward in some other way. When plants are planted with an intact container, roots will exit the drainage holes. It seems reasonable that if we add more holes, we should get more roots exiting, with the same principle as the old net pot. The experiment compared untreated (without copper amendment) containers withcopper treated pots containing only drainage holes, circular holes, or vertical slits. Holes were 1.9 cm (0.75 inches) in diameter. There were either 3 or 6 holes per container. Slitted containers had either 3 or 6 vertical slits per container. The slits were approximately 9.5 cm in length and 3 mm wide. The area of each slit was the same as that of each hole.

We compared *Hemerocallis* 'Catherine Woodbury' with *Forsythia* 'Meadowlark'. The experiment began in April 2000. Rooted cuttings of forsythia and single fans of

Hemerocallis were potted into 15-cm (6-inch) fiber pots. Plants were established in the greenhouse and then moved outdoors in late May where plants with their pots were either transplanted to the soil or were potted into 3-gal (Classic 1200) plastic containers in a Sunshine #4 growing mix. One half of each plant group (10 pots for treatment for both field and container-grown) were harvested in September, while the remainder will be harvested in 2001. To compare treatments, we measured top growth, pot strength, and the mass of roots that came through all pot openings. Field-grown pots were dug to include roots 10 cm beyond the pot wall. The dirt was then washed from the roots so the root mass could be measured. For container-grown plants, the original fiber pot and all roots were separated from the planting medium outside the pot by washing. This report includes preliminary results for the Fall 2000 harvest.

General Results. No pot treatment had any effect on above ground plant mass of either forsythia or daylily after one growing season.

After one growing season, all untreated pots — field or container — were 50% to 75% disintegrated, so these pots had little effect on roots entering the surrounding soil or growing medium Fig (1).

Among the copper treated pots, there was little difference in pot strength as measured by a Compact Gauge penetrometer (Dillon, Fairmont, MN). All copper treated pots were extremely soft, but were still intact.

Although pot side walls were soft, roots did not penetrate the pot side wall, rather, they exited openings (Fig 2). Although numerical data were not available at this time, it did appear that more roots exited the pot if more openings were provided. In addition, it appeared that more roots exited slits than holes, perhaps because of the tendency for roots to explore the growing medium in a circular pattern.

In summary, it appears that pots can be successfully planted either to the landscape or to the next growing environment. Short-term crops need not have any copper incorporated into the matrix. However, if the pots are to be grown for several months or a season above ground, then copper must be used in the fiber to insure long pot life and holes should be provided to facilitate the rapid exit roots from the pot when planted in the next growing environment. Further data collection from this harvest and results from the 2001 harvest should confirm these observations.