Fiber Pots for the Ornamental Plant Industry

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INTRODUCTION

Prior to World War II most nursery stock was marketed either balled in burlap (B&B) or bareroot. Now, more than half of all nursery plants sold in the U.S.A. are marketed in containers, and the percentage is slowly increasing. Plants are grown in containers for a variety of reasons; ease of shipping, attractive sales units, and some plants, like *Pyracantha*, *Cotoneaster*, and *Viburnum* that do not transplant well as field-grown plants, are ideally suited to container culture.

Container growing began after World War II when a California nurseryman tried to grow plants in used 1-gal juice cans. Plant growth was acceptable, but the insides of the cans corroded and, because the sides were not tapered, it was very difficult to remove the plant from the container. To correct this, the juice cans were placed in a press that tapered and crimped the sides (Fig.1).

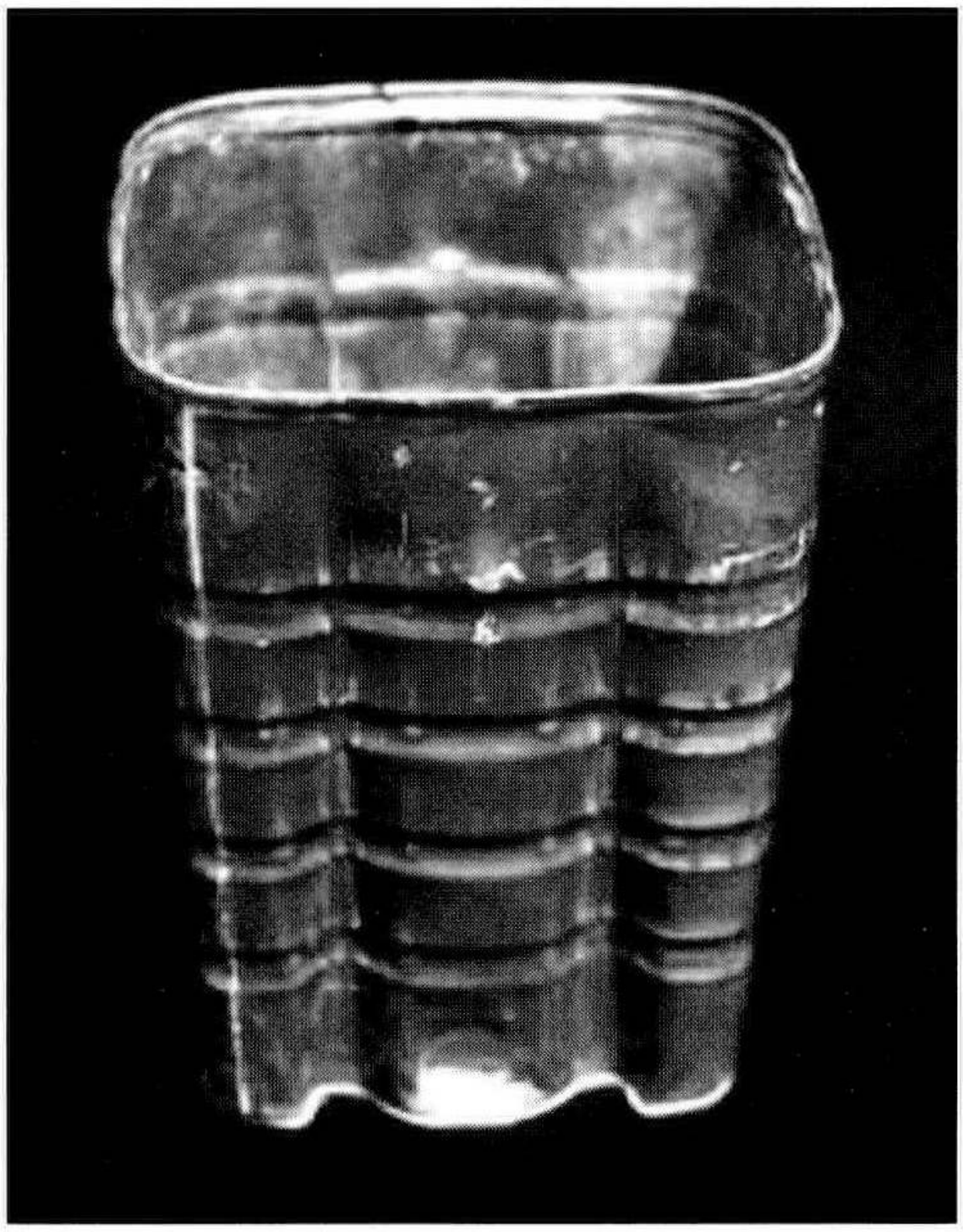

Figure 1. Used 1-gal juice cans were crimped to taper pot sides to allow easy extraction of the root system.

The result of this innovation was the birth of nursery container growing in the U.S.A. The negative part of this story was that, while the original container held 1 gal, the volume of the new crimped and tapered container was now reduced to about 3 quarts (0.75 liters). Thus began a long and confusing history of nursery-pot size based on an incorrect volume rather than on either actual volume or on dimension. The use of pressed juice cans continued well into the 1950s when they were replaced by plastic pots.

In addition to steel and plastic, plants have been grown in a variety of other containers including: plastic bags, tarpaper pots, pressed peat pots, pressed paper, and clay. The pot with the longest history has been the clay pot used primarily in glasshouse culture for centuries. Heavy, easily broken, and prone to surface algae buildup, but stable on the bench top, and above all, well aerated, the clay pot became the standard for container culture. Even today, older growers wax nostalgically about the advantages of clay, especially its superior aeration qualities which resulted in fewer root diseases.

Paper, or fiber, pots have been used for many years, especially for seasonal, bareroot crops like roses, field-potted shrubs, small trees, but pot longevity has been unpredictable. If fiber containers were overwintered and froze to the ground, moving pots before spring thaw could rip the bottoms open. Fiber pots, depending on how wet or warm they were kept, often lasted only for a few months. Recently, copper-based fungicidal additives have consistently extended the life of these pots to more than 1 year (Fig. 2). Longer pot life should breathe new life into a product that has distinctive cultural and environmental advantages.

Figure 2. Fiber containers can be treated (right) to last more than one season.

Combined with other advantages, fiber pots appear to be a more attractive choice to some growers. Environmentalists would consider fiber pots to be "green" because they are manufactured of recycled paper. The obvious advantage is that used fiber pots can be composted rather than placed in a landfill where plastic pots usually go (Fig. 3).

Figure 3. Many nursery businesses have pot dumps that cannot be effectively recycled.

Fiber pots "breathe". Like the old-fashioned clay pots, fiber pots are highly aerated, probably resulting in fewer root related diseases. Because water vapor moves through pot sides and evaporates to the surrounding atmosphere, evaporative cooling results in reduced root zone temperatures (Fig. 4). Roots on the south side of black poly nursery containers, especially in the southern U.S.A., can easily reach root-killing temperatures. Some plants like *Thuja occidentalis* or *Euonymus alatus* and *Hosta* are sensitive to high root temperatures, thus southern nurseries may have difficulty growing these taxa. Finally, copper-containing fungicides added to the fiber not only lengthen pot life, but also reduce root penetration of pot bottoms in much the same way that happens in copper coated polyethylene containers (Fig. 5). Besides being easier to remove from copper-treated fiber pots, copper truncated roots freely branch to more thoroughly explore the growing medium. Implications related to water use efficiency and nutrient uptake remain to be investigated as does the possible reduction of root-born diseases in copper-treated fiber pots. Further, while root systems are more highly aerated in fiber containers, water also moves through container walls more freely, so more attention has to be paid to irrigation practices (Fig 6.) Rather than using lightweight media, growers may have to consider heavier media to alleviate this problem.

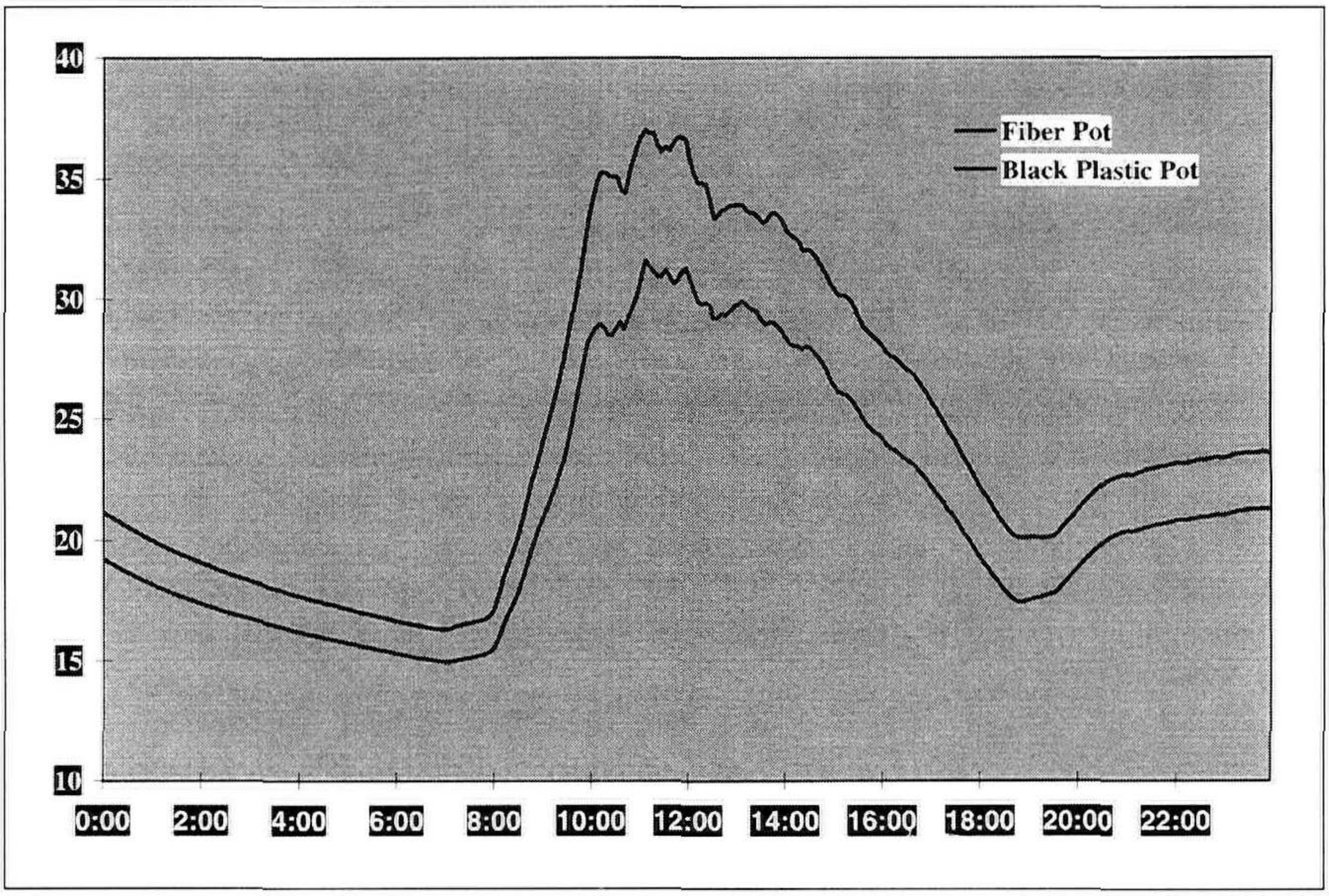

Figure 4. Evaporative cooling through the pot wall can significantly reduce medium temperature on the south sides of pots.

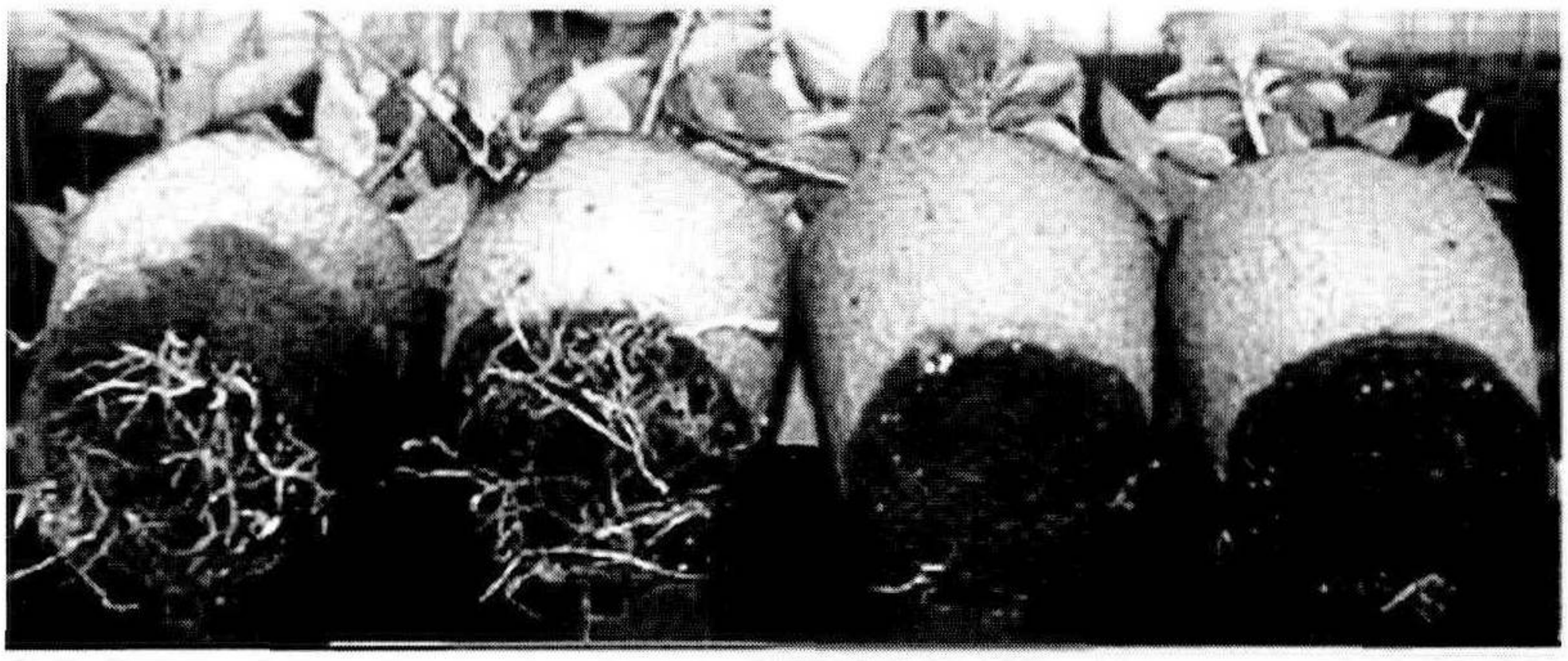

Figure 5. Copper treated fiber pots reduce root penetration of pot walls by *Forsythia* roots.

Figure 6. A large east coast grower raises 1-gal liners in fiber pots.

Although there are many advantages to using treated fiber containers there are some significant research challenges. It appears that the lower sides and bottoms of sizes larger than 2 gal need to be strengthened. Adding inside bottom gussets may solve this issue but that remains to be tested. Smaller pot sizes are competitively priced and larger sizes are actually less expensive than comparable sized poly containers.