A REVIEW OF PREPACKAGED PLANT GROWING MEDIA

R. A. Ashley, Extension Vegetable Specialist
and
J. W. Bartok, Jr., Extension Agricultural Engineer

A good growing medium must fulfill several requirements. First, it must support the plant. Second, it must provide good aeration, good drainage and at the same time have a good water-holding capacity. And finally, it must be relatively free from weed seeds, nematodes and disease organisms. It is also desirable to have some capacity to retain nutrients and a pH suitable for the plants to be grown.

For many years, greenhouse operators met these criteria by mixing several components, each of which possessed one or more of these desirable traits, to obtain a suitable medium. For example, peat would be used to provide water-holding capacity and aeration; coarse sand to provide darinage; and soil to retain nutrients.

Properly prepared, these mixes did their job well. But they also had their failings. While peat and sand obtained from the same source is relatively uniform, soil is not. Therefore, the mix could not be prepared in set proportions from year to year with any assurance of results. Instead, time-consuming testing procedures had to be used to determine the amendments necessary to gain optimum performance from the mix. Also, while peat and sand are relatively free from pests, again soil is not, necessitating costly and time consuming chemical treatment or pasteurization procedures.

The obvious answer, if the soil was causing all the trouble, was to eliminate it. It was found that good quality plants could be grown in mixtures containing only sand and peat. The need for pasteurization was largely eliminated and the need for nutrient testing reduced. Mixes could be prepared by "recipe" from year to year and similar results obtained.

The sand-peat mixes had a weakness, however. They did not retain nutrients well, and constant feeding was required to maintain plant growth.

Continued research with soilless mixes led to the introduction of vermiculite. Peat-vermiculite mixes had the advantages of peat-sand plus they had some capacity to retain nutrients and were considerably lighter in weight.

Since then numerous other materials have been found which will combine with peat to make satisfactory growing media. These include perlite, shredded styrofoam, and several types of slag and other industrial wastes.

Widespread use of soilless growing media eliminated many of the grower's preparation problems. He was still faced, however, with the task of gathering the necessary components, mixing large volumes of these components in suitable proportions and storing the finished product until needed. Industry responded to this need by producing soilless mixes and packaging them in 3 to 6 cubic-foot containers. Then all the grower had to do was purchase the appropriate number of bags, open them (which was a serious problem where large volumes of mix were used), and fill the growing container.

These were the first commercial prepackaged growing media. They were quite conventional in composition, being for the most part the same mixtures of peat and vermiculite or peat, vermiculite and perlite that the grower was preparing himself. Because they were based on well-researched components, these commercially prepared, soilless mixes were quite successful.

The main deterrent to their widespread use was the small container size and the high cost. Much of the cost factor was the result of shipping cost, the very light weight and high bulk of the product filling the carrier volume before the charged weight was reached. Efforts were made to overcome this disadvantage by compressing the mixes into bales. This was quite successful in reducing costs.

Another approach to overcoming the high shipping costs was combining the growing media in compressed form with the growing container. Redi-Blocks were such a product. These combined a compressed peat-vermiculite block with paper market pak. The block was compressed to a size that permitted it to be placed in the bottom of the pak and the paks nested just as if they were empty. The container and media could be shipped and stored in the area required for the container alone. After unpacking, the blocks were wetted and they expanded to occupy the full volume of the pak. They would produce plants equal in quality to those of conventionally handled mixes.

The idea of a single unit as both media and container was expanded when several propagation units intended for rooting cuttings were adapted for use in bedding plant production.

Jiffy-7's are compressed peat pellets, encased in a nylon net, that when wetted expand into a net "pot" filled with peat moss. Plant growth is good in these containers limited only by the physical size of the root ball. Wetting is not particularly difficult but proceeds faster if warm water is available. Misting also seems to be superior to a coarse stream of water in initially wetting the pellets. Jiffy-7's do not require constant feeding to support plant growth and nutrient retention is sufficient to provide adequate shelf life. Also, plastic containers holding 6 or 10 Jiffy-7's are available as a marketing package.

Jiffy Belts are similar to Jiffy-7's except that they are rectangular and have the peat fibers oriented vertically during manufacture. This makes sticking of cuttings easier. Jiffy Belts are intended as a rooting medium and no retail market containers are provided.

The BR-8 block is composed of plastic impregnated cellulose fiber and consequently has the moisture holding capacity and limited nutrient holding capacity of the cellulose combined with the stability of plastic. BR-8 blocks are molded in strips of 12 for use with cuttings or transplants, or 18 for seeding. Several different hole sizes are available in the 12 block units while the 18 block unit has a single shallow hole for seed. Blocks are also available with four holes of different sizes to reduce the inventory problem.

BR-8 blocks work well as a rooting medium as long as the cutting fits snugly in the hole. For transplants, only the larger hole sizes are practical as it is very difficult to get the seedling's root system into the smaller sizes. All but the finest seed can be

planted in the deep holes intended for cuttings. The seeding blocks have shallow holes for any size seed. The seeds are not generally covered when sown on these blocks.

While plants can be successfully grown in BR-8's, there are several problems. The blocks are somewhat fragile when dry and can easily be broken from the base with rough handling.

Nutrient retention is slight so that constant feeding is necessary. This low retention of nutrients also makes for a short shelf life after plants leave the grower's care. The blocks are not suitable for use as a retail sales pack without some protective carrier. As retail sales packages, BR-8 blocks suffer from their fragile nature and a tendency to support a heavy algal growth on the surface which makes them unpleasant to handle.

0-902 Propagation Medium is a cellular phenolic foram formed into blocks of 8 cubes. While it is quite successful as a rooting medium, 0-902 blocks have serious disadvantages as a growing medium. Again, the blocks are very fragile and tend to break apart with even careful handling. Constant feeding is necessary to maintain adequate growth and nutrient retention is very slight giving plants a very short shelf life.

Kys-Kubes are compressed peat-vermiculite cubes intended to combine the role of rooting media and growing media into one prepackaged unit. Toward this end, Kys-Kubes have a large diameter, shallow hole suitable for direct seeding of most crops with a wedge-shaped slit beginning at the bottom of the hole and continuing to near the base of the cube. Cuttings

can be forced into this cut, thus forming a snug fit with any size cutting. Two smaller holes are also provided for smaller cuttings and fine seeds.

Water and nutrient retention with the Kys-Kubes is excellent. Shelf life in retail trade is consequently very good. A good selection of carriers is available for use with Kys-Kubes. For wholesale use, a plastic tray holding 50 cubes is available. If you have plastic trays you wish to re-use, Kys-Kubes are also packaged in cardboard trays of 50.

For retail sales, plastic trays containing 8 paks of 6 cubes each may be obtained. The cubes are packed in these carriers at the factory and need only be lifted from the case to be ready to use.

Kys-Kubes have at least one disadvantage. They are difficult to wet. Mist and warm water are again most effective in wetting the dry cubes, but care must be taken that the cubes are wet all the way through, as surface wetting is easily accomplished but of little value. This wetting problem can reoccur if the cubes are allowed to dry out excessively during use.

An analysis of the cost of prepackaged plant growing media based on Winter 1973 prices shows that all forms of a peat-vermiculite media cost about 3 cents per plant. This includes the media, the tray or holder and the labor to get the package ready for planting.

Dr. Roy W. Judd, Jr., one of your editors for 13 years, has accepted a position as Extension Horticulturist and Associate Professor of Plant Science in the College of Agriculture and Natural Resources at the university. A search is under way to fill the position he has vacated as Regional Extension Agent in Horticulture in Southeastern Connecticut. He will specialize in bedding plants and diseases of ornamental herbaceous crops.

Congratulations Roy!