

Plug Production for Seedlings

Andrew Eames

35 The Wharf, Shadlow, Derby DE72 2HG

The term plug describes modules ranging from 1.5 ml by volume up to 4 cm square—or larger. These are clearly extremes and most seedlings are produced in plugs ranging from about 2 to 10 ml in compost volume. In nursery stock terms it is quite appropriate to think of plugs as mini-liners; the description fits them quite well.

The first experiments with plugs, or modules, occurred in the 1950s. It is debatable whether the idea was actually invented—they probably gradually developed from a scaling-down of larger techniques.

It is certain that American growers must be credited with the first commercial use of what we would now recognise as plugs. They were certainly in use by 1960, and after a relatively slow start their use accelerated; by the early 1970s they were in widespread use throughout the U.S.A. and they were beginning to be used in the U.K. Since that time they have become a very important tool in the production of pot and bedding plants.

There are no statistics about numbers of plugs produced, but my own personal estimate of the number sold in the U.K. by commercial plug producers is about 1 billion annually—and many growers produce their own, too. So what proportion of the bedding plant crop is produced from plugs? Again, there are no reliable figures, but my own estimate is at least 70%.

For the more specialised subjects such as begonias the percentage is likely to be 95% or more.

Commercial plug producers must be amongst the most specialised of all growers of protected crops. The technology includes automatic seeders that can handle virtually any size or shape of seed and sow them in individual cells, and bar-coded trays that the computer can keep a track of right through the production cycle on movable tables. Plants are watered automatically, and heating, ventilation, and shading are all computer controlled.

The need for full cells in the plug tray has also caused something of a revolution in the seed trade, with tremendous pressure for high levels of uniform germination. This has been achieved by improving the inherent germination ability of varieties and also by seed treatment techniques including priming—bringing the seed to the brink of germination and then holding it in that condition. However even the very best seed does not reliably give 100% germination, and subjects such as wild flowers are also grown which are notorious for their uncooperative nature in commercial conditions. But the customer still wants a full tray of plugs.

To date, this has meant a degree of gapping-up by hand, but in the last year or two machines have appeared which can do the same thing. These scan the plug tray and record where plants are missing or inadequate, and further along the line these same cells are blown out by compressed air. The machine to actually put replacement plugs in the cells is still on trial, but likely to be in full use by the end of 1994.

Many growers, too, have chosen to grow their own plugs. Larger ones have adopted the sophisticated technology, but a surprising number of smaller growers

produce their own using simpler techniques, usually concentrating on the easier subjects.

There are several advantages of plugs. The most important is the ability to achieve a greater throughput in a production unit; although more time is spent in the propagation area, far less time is spent in growing the finished crop. And, if the plugs are bought in, this is optimised even further. Not only do plugs utilise space better, they are also quicker to transplant, and automatic transplanting systems can be used. Another aspect is the better uniformity and quality of the finished crop when grown from plugs.

The rise in plug production has closely paralleled the spectacular rise in the growth of the bedding plant industry. Since the early 1970s the volume of bedding plants grown in boxes has increased four-fold, and pot-grown bedding has increased from nowhere to about 100 million pots annually. These are Ministry of Agriculture (MAFF) figures, and there is good reason to believe that they are a considerable under-estimate. There are clearly several reasons for this spectacular rise, but plug production is one of the factors which has made it possible. It seems quite likely that the spectacular growth of the bedding plant industry may be slowing down; it could be argued that various aspects of modern horticultural technology have made the growing of the crop too easy, and in the eyes of some growers plugs might well take much of the blame.

Pot plant growers, too, have been quick to adopt plug technology, and wild flowers and perennials are well suited to plug growing. Nursery stock producers too have adapted plug techniques for appropriate seed-raised subjects, as well as for cutting production, and of course, micropropagated plants.

The use of plugs will expand into new areas. We have already seen their use for seed-raised nursery stock, and I have referred to wild flowers, where they have increased the use of species that do not establish well from seed. The potential here for the use of large volumes is considerable, for example in areas subject to soil erosion where seed is unlikely to be successful. Forestry, too, has enormous potential; large "plug" type modules are already used, but the economics of using something smaller are obvious, and open the way to revolutionary ideas such as replanting de-forested areas by aeroplane.