medium and small. They are heeled into a sheltered area prior to dispatch.

PROPAGATION OF BEDDING PLANTS IN SOILESS MEDIA

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When bedding plant production commenced in Western Australia early this century soil used for seedling trays was basically composted plant material, the source being straw, weeds, expended plant material, stable manure and straw, or any decayed plant material available. As the demand for larger volumes of growing media outstripped the supply, various mixtures of loam, sand, cinders and stable manure were used.

The acceptance of the U.C. system for container grown plants saw, for the first time, a soil mix with actual measured amounts of the elements required for plant growth. Spagnum peat and fine sand provided the basis of inert material. Problems continued with the volume of sand used. The local sand supply was abundant although the particle sizes were considered small. Variable pH meant a close watch was needed on this. The weight factor was a problem in loading up mixing machines, conveyors, conveyances and caused increased delivery costs.

In recent years, because of the high cost of spagnum peat, a substitute lightweight material was searched for. Local sedge peats were available but did not prove a satisfactory substitute for spagnum peat in seed raising mixtures. After a great deal of trial and error, our hardwood sawdust showed great promise. Firstly, it is low cost; it is plentiful, very lightweight, low pH and contains no growth affecting toxins. It leaches well and has a moderating affect on temperature. Hardwood sawdust appears to inhibit root destroying pathogens that are problems with peat and fine sand mixtures.

As a result of a visit to Holland during 1977 I decided to experiment with a sand-free medium, using a mixture of ⅔ jarrah (*Eucalyptus marginata*) or wandoo sawdust and ⅓ medium-grade spagnum peat of German origin. Using 6 lbs. of urea formaldehyde or I.B.D.U. to each cubic yard of sawdust to control the consumption of nitrogen by the slowly composting process we were able to stabilize the situation and add the balance of elements required for plant growth. Success in the field was immediate. The only heavyweight component was water.

Because the sand was deleted completely we had removed all of the abrasive material, stabilised the pH and taken the weight load from working personnel, resulting in greater expediency in the production area. With the advent of polystyrene-foam trays, a box of seedlings has reduced in weight from 5kg to 1kg. For long distance freighting, wooden crates have been substituted with waxed cartons, further reducing labour and freight costs.

With the introduction of various type cell packs and mini punnets I believe that a deal of scope is evident for bedding plant growers to propagate many seed lines for the container growers. There is evidence overseas of bedding plant growers producing started plants of cyclamen, F_1 geraniums, begonias, asparagus ferns and similar plants at attractive prices, in keeping with their mass production and seed raising facilities. Plants could be raised on a contract basis incorporating a forward ordering system. My own nursery operates this system in a limited way.

CAPILLARY WATERING OF CONTAINER-GROWN PLANTS

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The importance of using the best possible techniques for watering plants is not always recognised in commercial nurseries, largely because plants have a very considerable ability to survive less than ideal conditions, without showing visible signs of the effects of those conditions. It is only when such plants are compared with plants grown under better conditions that the full effects of poor watering techniques can be appreciated.

Plants use very large quantities of water for growth, yet comparatively little of this water is retained in the plant. In the lower surface of the leaves are the stomata; during daylight hours these are open to permit air to enter the leaf. Inside the leaf the air comes into contact with cells whose walls are bathed with water; carbon-dioxide is absorbed into this water, and passes into the cells, where it is used in photosynthesis. At the same time, water is evaporated from the cell wall and carried outside the leaf in the air current. This process, called transpiration, is an essential part of the uptake of CO_2 by the plant, but it results in a steady loss of water from the plant.

Normally the water lost from the leaves by transpiration is replaced with water which is taken up by the roots. Provided