ROCKWOOL BLOCK PROPAGATION SYSTEMS FOR NURSERY STOCK

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The Grodan Single Block System (SBS) is a new cutting propagation procedure which incorporates rockwool blocks ready filled in a modular tray for immediate use on the nursery. Practical aspects of its use and commercial growers' experiences are discussed.

The Material. Rockwool is a uniform growing material made from melted volcanic rock spun into fibres. It is inert and free from pests and diseases. In the same way as peats vary in their water:air holding characteristics so do different rockwools. Only Grodan rockwool is discussed here. This material has been used as a medium for the production of cut roses and salad crops for over 15 years.

Grodan SBS offers the potential for improved rooting percentages, faster rooting, and easier potting along with easier management. Because Grodan SBS is propagation block and carrying tray in one, this cuts out the labour input, machinery costs, and management time involved in organising the mixing of media and filling of trays with loose fill materials.

Two block sizes, 25mm (SBS 25) and 36mm (SBS 36) square give a choice to suit cutting size. For uniform softwood cuttings the 6mm diameter, 15mm deep cylindrical holed blocks should be used. For variable thickness cuttings the tapered holed block (8mm diameter at the top and 20mm deep) is the best choice. Both block sizes are also available without holes which some growers prefer for semi-hard and hardwood cuttings. All blocks are 40mm deep.

Two cutting densities are possible with each size of block. This is achieved with full trays and half-filled ''chessboard'' trays. The SBS 25 provides 150 or 75 blocks per tray and the SBS 36, 77 or 39 blocks per tray. This gives densities of 920 and 460 blocks per sq. m. using the SBS 25 and 470 and 231 blocks per sq. m. with the SBS 36. The trays (525mm × 310mm × 29.5mm) can be split into single (SBS 36) or double strips (SBS 25) for wider spacings.

Use on the Nursery. Many growers who have tried SBS for the first time have been successful even though it has been treated in a way similar to their existing peat system. Their results, in open mist, fog, sun tunnels, and tented polythene systems may be improved upon as more experience is gained.

On a nursery which runs a very dry regime, a take of 52% of *Garrya elliptica* 'James Roof' and 43% *"Rhumus argenteo"* was achieved compared to a take of 40% and 28%, respectively, in its standard grit medium. On another nursery using fog, a 77% take of *Garrya elliptica* 'James Roof' was seen in six weeks compared to a 45% take in nine weeks using 50:50 peat:bark mixture from late autumn cuttings. Cuttings from the same subject in late April again showed faster root initiation—three weeks in rockwool and six weeks in the nursery mix.

Rockwool has also proved to be a useful material for weaning off micropropagated material. *Yucca filamentosa* 'Bright Edge' weaned in a fog house achieved 49% take in the first trial and, with more experience, 62% take was achieved. This is compared to just 40% take in the normal nursery peat mix.

Using just main's water (pH 5.7) on a nursery in the West Country, a take of 75% was recorded with *Camellia japonica* 'Debbie' compared with 60% take in the standard grit system. An azalea, *Rhododendron* 'Addy Wery', also gave a high take of 94% in SBS.

In another trial looking at disease risk, using the standard nursery peat, *Rhododendron* 'Ruby Hart' × *R. forrestii* var. *repens* suffered 22% loss compared with just 2% in SBS. *R.* 'Percy Wiseman' was not so dramatic with 18% loss in the peat and 10% loss in SBS. With *R.* 'Cheer' there was no loss in either medium.

With easy subjects rockwool blocks, SBS, offers quick throughput. In a speed trial, *Lonicera pileata* from 2 May cuttings were potted four weeks before the peat modules. *Euonymus fortunei* 'Emerald & Gold' cuttings taken at the same time could all be potted on 1 June—with the peat modules judged to be at least two weeks behind With *Caryopteris* 'Heavenly Blue' much more even rooting was seen in SBS compared with the nursery mix.

Getting Started. The rockwool blocks must be thoroughly saturated with water, pH adjusted in hard water areas for ericaceous subjects. If the water supply is below pH 6 no adjustment should be needed for this group of plants.

The quickest way to wet up the blocks is to submerge the tray in a tank. The blocks are held firmly in the tray and will not float away. Alternatively, they can be watered overhead using a fine rose or placing under mist. Using this method it is important to remove a few blocks to check that they are fully soaked to the base The whole block will look olive green and water will be released if it is gently squeezed

Cuttings should be given a normal hormone treatment, if required, and then be pushed home into the blocks Trays can be carried vertically which allows one worker to carry up to 300 struck cuttings at a time. It also acts as a quality control since cuttings which have not been struck properly will fall out.

Propagation Bench. As with all propagation media it is important that excess water can drain away to prevent waterlogging. Place SBS rockwool blocks directly onto free draining sand or gravel beds. If the beds dry out, water will be sucked out of the blocks. One cure is to cover the bed with perforated material, such as Mypex, which will act as a capillary break and so stop the sand or gravel affecting water movement in the blocks.

Feeding. Rockwool does not contain any nutrients. This means crop nutrition is under the total control of the grower. Generally, a low nutrient level is required. At this stage the normal nursery water is used. After initial rooting, feeding can be carried out on a weekly basis during active plant growth. This is more important with very small cuttings that have limited nutrient reserves. The liquid feed should contain a balanced N:P:K ratio with full trace elements.

Rooted cuttings can be held back, pushed on, or just maintained by adjusting the feed. This should allow growers to manipulate growth to fit in with potting schedules but this is an aspect which has yet to be fully exploited by growers.

Regular monitoring of nutrient levels during propagation, using a conductivity meter (measures salt levels in the water) is a very quick and easy way to gauge if salt levels are building up or if more feed will be beneficial. A trial in the summer of 1990 maintained fully rooted *Spiraea japonica* 'Gold Flame' cuttings in SBS 36/77 rockwool for over eight weeks (June and July) without loss of quality using just a weekly feed. An autumn trial, when plant growth is less active, held rooted cuttings for six months. The subjects included material from the genera *Prunus, Ilex, Cotoneaster, Viburnum, Mahonia, Cistus, Garrya, Ceanothus, Choisya, Escallonia,* and *Euonymus.*

Watering. Because there is constant evaporation from the surface of the rockwool, the blocks will require more frequent watering than a peat system. Under mist this has the advantage of being able to run the mist to the cuttings' requirements with less risk of waterlogging. This movement of water also helps to maintain a more humid microclimate around the cuttings. In an autumn trial *Ilex* × *altaclarensis* 'Golden King' cuttings, taken in October, retained all their leaves in SBS 36/77 trays but suffered severe leaf drop in the standard nursery peat propagation mix.

Within the rockwool blocks the water is only very loosely held. Peat tends to bind a proportion of water onto its surface Dry rockwool will also rewet more quickly than peat.

Air. It can be argued that air is the most important component in the propagation mix. During rooting and root development there is a high demand for oxygen for cell division and expansion. Because finely milled peats have to be used to be able to physically

fill small celled module trays the result is a medium with very small pore spaces. These can easily be filled with water and air levels can drop to 5%. Over time the compost will settle and the larger air pores will be reduced. The risk of over watering is high and water management critical.

SBS rockwool blocks only contain about 3% rockwool fibres and offer the grower a wider working range of air percentages compared with peat modules—from about 12% to 45%. The constant evaporation from the SBS blocks means fresh oxygen is also moved into the rooting zone between each watering. It is this increased air percentage in the rooting zone that allows quicker rooting and high percentage take in a range of subjects.

Freedom from Disease. Since rockwool is formed at high temperatures it is clean. In all trials with commercial growers the level of disease has been very low. If fungicidal drenches are used as routine these should be applied after initial soaking up of the rockwool blocks. Existing recommendations for agrochemicals take account of the fact that a proportion of the chemical will be adsorbed onto the peat or soil particles. This does not happen with rockwool blocks—what is applied is present in the solution around the cutting base or roots. This offers scope for reduced chemical rates, generally down to 20 to 30% of the standard rate.

Potting On. Cuttings in rockwool blocks should be weaned off in the normal way before potting on. Four or five roots should be clearly visible outside the blocks before they are ready to pot. It is important to soak the blocks just before potting and to water in well directly after potting. This is because peat will tend to suck water out of the blocks. The blocks should be potted deep, up to 25mm, below the compost surface. This is to avoid the blocks becoming visible as the compost settles and to keep them below the dry surface. Keep the pots well watered for the first week after potting for good establishment.

Because rockwool blocks are self supporting, rooted cuttings can be potted at an earlier stage than peat modules. This is because roots have to bind around peat before the young plant can easily be handled. There is also less root disturbance with rockwool blocks since only the block is handled, not the delicate roots when potting. This also allows for easy grading at potting. If some cuttings are weak they can simply be returned to the tray and the propagation house for a little longer without damage This reduces waste of plant material.

Environmental aspects. Rockwool blocks will be physically broken up as stems and roots thicken. In the soil the rock fibres will gradually break down into mineral particles by normal weathering. One cubic metre of rock yields about 28 cubic metres of rockwool. Any sub-standard rockwool is recycled