The Use of Paperpots for Growing Revegetation Species

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In late 1993 our nursery was requested to propagate 30,000 native grasses, sedges, and rushes for planting around the margins of two lakes created during a land development project.

Part of the land development was adjacent to palustrine wetlands and, in particular, was in close proximity to a protected scientific wetland reserve. The landscaper engaged to undertake the revegetation and planting programme insisted that two main criteria must be met when the plants were to be supplied.

Firstly, the plants must be propagated from endemic species to maintain the genetic purity of existing vegetation and secondly, the plants were to be supplied either bare-rooted or in biodegradable containers to allay any possibilities during planting of plastics entering into the new or existing waterways and wetlands.

Of the 32 species selected, it was decided that only two species, *Phormium tenax* and *Cortaderia toetoe* would be propagated and provided bare-rooted, the balance of plants, being mainly species of *Carex, Juncus, Isolepis, Baumea,* and *Scirpus*, were to be container grown. A growing medium of granulated bark, peat, medium-grade pumice, and organic wetland substrate (13 : 4 : 2 : 1, by volume) was chosen. During excavation of one of the lakes, considerable organic wetland substrate was excavated and a small portion of this was incorporated into the medium. Because of the growing medium and the second criteria mentioned, it was decided that the plants would be grown in paperpots which had only been introduced into New Zealand a few years earlier. The paperpots chosen had a diameter of 4.9 cm and a height of 7.5 cm and were glued together with watersoluble glue in a sexangular form of 130 pots per batch. Each batch was stretched open and placed in a plastic tray and removable side clips held the stretched batch open and in place. As all plants were propagated by division of mother plants (ex situ), which were grown from seeds collected locally from plants growing naturally (in situ), the pots were only filled halfway before the divisions were inserted and then topped up and firmed down.

The divisions all had healthy fibrous roots and the minimum amount was retained and the top growth trimmed back very hard leaving in most cases only 2 or 3 cm of top growth showing.

The trays were then placed under shade (50%) in a growing shed that was maintained at 24C. Automatic overhead irrigation controlled by an electric "leaf" was used. The trays were laid down on wooden slats 2 cm thick, which rested on plastic sheeting, that allowed 1 cm of water before it was designed to overflow. The concept of open-bottom pots, resting on slats partially immersed, was mainly to promote the root growth of these wetland species down into the water, but also to observe root growth, so that if necessary, root pruning could be done. The glue holding the pots together soon dissolved and allowed individual pots to be lifted for inspection. Decomposition of the paperpots began to show after 3 months and at 6 months most of the cellulose paper had decomposed, leaving a net of synthetic fibres

from which strong fibrous roots were showing. Top growth had been monitored and in some cases shearing was necessary. As no fertilisers were added during the mixing of the growing medium, an application of foliar fertiliser was applied after 3 months and again just prior to removal from the nursery. After 6 months all plants were removed from shade and hardened off for a 6-week period prior to dispatch and planting out on the sites.

We had some concern that the net of fibre left after the decomposition of the paperpot did not decay biologically but by means of physiologic factors. We decided that bacteria present in the wetlands would assist in the fibres being humified with time and that the plants roots themselves would hold the fibre net in place. The net was flexible enough to expand and allow large rhizomes, such as, those of *Baumea juncea*, to spread and colonise.

We did not believe that damping off would prove to be a problem so no Terrazole™ was added to the growing medium at mixing. Had we been propagating these species by seed germination and considering the addition of the organic wetland substrate then Terrazole™ or similar product would have been a necessity. No fungal diseases were detected on any of the species and only normal routine spraying was carried out to prevent any insect problems from occurring.

A granular topdressing was applied one week prior to moving the plants out of the shade and all species responded with strong growth flushes both foliar and at their roots.

CONCLUSION

For this particular propagation and growing programme, there was need to implement a container system specifically requested by a client, owing to the potential environmental hazards that might be caused by accidental discarding of nonbiodegradable plant containers at the planting-out stage. With hindsight, we will in future similar programmes be using a paperpot that decomposes in a shorter period of time, to reduce the need to root prune and top shear to only once during lateral root growth. We believe that this form of biodegradable container is ideal to grow the types of revegetation plants mentioned and for direct planting into sensitive ecosystems, such as, this planting site.