

# MICROPROPAGATION OF PLANTS FROM THE CANARY ISLANDS

By Dr Michael F. FAY<sup>1</sup>

*ABSTRACT:* A range of Canarian endemics has been successfully micropropagated at the Royal Botanic Gardens, Kew, and distributed to other botanic gardens. Where required, plants have been returned to the 'Viera y Clavijo' Botanic Garden, Gran Canaria, to be grown on for reintroduction trials.

## INTRODUCTION

The Micropropagation Unit at Kew was established in 1974 with the remit of propagating those species which are difficult or impossible to propagate by conventional horticultural techniques. In recent years the work has become increasingly concentrated on rare and endangered species.

Because of the particularly precarious nature of oceanic island floras, many of the species which are being propagated come from islands including the Mascarenes, the Seychelles, Hawaii, St Helena and the Canary Islands. The work with species from the Canary Islands will be described in this paper. Information on the status of species was obtained from Bramwell and Bramwell (1974) or Bramwell (pers. comm.).

## MATERIALS AND METHODS

Plant material came either from plants at the Royal Botanic Gardens, Kew, or from the 'Viera y Clavijo' Botanic Garden, Gran Canaria.

---

<sup>1</sup>Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, UK

Vegetative material was sterilised in dilute sodium hypochlorite solutions (0.5-1.4% available chlorine) for 15-25 minutes. Seeds were sterilised in solutions with 1.0-1.4% available chlorine for 25 minutes. After sterilisation, the material was placed on a range of media and kept in a growth room at 22-24°C with a 16-hour photoperiod.

The media used were Murashige and Skoog (1962) (MS) with different growth regulator combinations for vegetative material for shoot proliferation and MS without growth regulators for rooting with vegetative material. Seeds were germinated and grown on half strength MS.

Plantlets were potted up in a mixture of 1 part free draining loam based compost and 1 part Terragreen (a calcined expanded montmorillonite). Weaning took place in a mist bench, and after 2-3 weeks the plants were transferred to normal glasshouse conditions suitable for the individual species.

### Case Histories

#### *Globularia sarcophylla*

This species is very rare and only occurs on Gran Canaria. Propagation had been attempted on Gran Canaria, without success, and therefore Dr D.Bramwell requested that micropropagation be attempted at Kew from vegetative material in the Kew collections.

Shoots grew out from lateral buds on MS medium with 0.5-2 mg/l benzyl aminopurine (BAP) +/- 0.1 mg/l naphthylacetic acid (NAA), and the resulting proliferating cultures were maintained by subculturing onto fresh medium every 6-8 weeks.

Rooting of shoots occurred 2-3 weeks after shoots were transferred to MS without any growth regulators. Plantlets were then successfully weaned back to conventional cultivation. Having shown that it was possible to obtain plants from the proliferating cultures, some of these cultures have been returned to Gran Canaria, where they are being grown on in the Micropropagation Unit. In addition, plants have been distributed to various other botanic gardens.

#### *Atractylis arbuscula* subsp. *arbuscula*

This extremely rare plant is known from only one location in northern Gran Canaria, and the site is now threatened by a road building scheme.

Material was taken into cultivation at the 'Viera y Clavijo' Botanic Garden and in vitro cultures were initiated in the Micropropagation Unit there. Proliferating cultures were given to the Royal Botanic Gardens, Kew, where they were further multiplied on the same medium (MS with 3 mg/l kinetin; Ortega-González, pers. comm.).

Shoots from these cultures were then transferred to MS without growth regulators, where they produced roots after 3-4 weeks. They were potted up and weaned as described above. Plantlets of this species will be offered for distribution to other botanic gardens on our next surplus list.

### *Limonium* species

Several species of *Limonium* have been micropropagated from lateral buds, using the same media as for *Globularia sarcophylla* above. These include *L. arborescens* (endangered species from Tenerife), *L. preauxii* from Gran Canaria and *L. spectabile* from Tenerife. *L. imbricatum* (a rare species from Tenerife and La Palma) was propagated from callus cultures derived from leaf tissue, as no lateral buds were available.

These four species all grew well in tissue culture, and readily produced roots on MS without growth regulators. A high percentage of plants survived weaning.

*L. dendroides* is an extremely rare and endangered species from La Gomera, and is now only known from three plants in the wild. A plant, derived from seed collected by J.Y. Lesouef, growing in Brest Botanic Garden, France, is the only one in cultivation. Propagation by conventional horticultural techniques has failed and the plant does not set seed. In vitro cultures were initiated by staff at the Botanic Gardens in Porquerolles, France. Shoot proliferation was achieved, but as yet plants have not been successfully weaned to compost. Proliferating cultures were sent to Kew, where they have been maintained. However, they have proved far more difficult to manipulate than other species in the same genus.

### Other Macaronesian Endemics

*Lavatera acerifolia*, *Aichryson palmense* and *A. porphyrogenetos* from the Canaries and *Isoplexis sceptrum* have also been successfully

micropropagated using similar techniques to those described above.

*I. chalcantha*, an endangered species from Gran Canaria, is being grown from seed in vitro, and weaning trials will be carried out shortly.

### Distribution

Where micropropagation is successful many more plants can be produced than are required by Kew. As a result, a list of surplus plant material is produced every one to two years and sent to more than 100 botanic gardens and institutes. A major benefit of micropropagation is that the plants are propagated under sterile conditions and therefore there are no problems associated with phytosanitary certification and quarantine.

In this way, many plants are now growing in other botanic gardens around the world, including *Cylindrocline commersonii*, a Mauritian endemic. Examples relating to the Canary Islands which have been distributed to other botanic gardens include *Echium* spp., *Limonium* spp. and *Globularia sarcophylla*.

### DISCUSSION

The technique of micropropagation has now been successfully applied to a wide range of endangered species at Kew and at other institutions around the world. Although material has been distributed to other botanic gardens, the number of successful reintroductions to the wild is still small. This is an area which requires extra work.

In the future, other related technologies, including slow growth gene banks and cryopreservation, are likely to become increasingly important in the conservation of the world's flora.

### REFERENCES

BRAMWELL D. and BRAMWELL Z.:

1974. Wild flowers of the Canary Islands. Stanley Thornes, London.

MURASHIGE T. and SKOOG F.:

1962. A revised medium for rapid growth and bio-assays with tobacco tissue cultures. *Physiol. Plant.* 15:473-497.