Micropropagation of *Calceolaria* 'Kentish Hero' and *Zauchneria californica* subsp. *nana* 'Dublin'©

G. C. Douglas
Teagasc, Agriculture and Food Development Authority, Kinsealy Research Centre, Malahide Rd. Dublin 17, Ireland

INTRODUCTION

Micropropagation is now widely accepted and applied in the nursery stock industry. Some large nurseries have dedicated micropropagation units while many others use specialist micropropagation companies to supply material for markets, which have been identified and developed. This paper presents two new protocols for micropropagating *Calceolaria* 'Kentish Hero' and *Zauchneria californica* 'Dublin'.

Calceloria integrifolia is an evergreen frost hardy subshrub with bright yellow flowers and is one parent in the complex *C.* Fruiticohybrida Group which contains the cultivar Kentish Hero with bronze to orange flowers, and a long flowering period.

Zauchneria californica subsp. *nana* 'Dublin' is well known as a hardy, late flowering perennial with bright red flowers. Viable methods to micropropagate these plants are presented.

MATERIALS AND METHODS

All shoots were collected from the greenhouse, washed in running tap water for at least one hour, rinsed for 15 min in 0.1% w/v mercuric chloride, rinsed in sterile water followed by 18 min in 7.0% w/v calcium hypochlorite and four washes in sterile water.

Multiplication medium for *Calceolaria* was Woody Plant Medium (WPM), (Lloyd and McCown, 1980) and for *Zauchneria,* was Murashige and Skoog (MS), (1962); each had 0.2 $mg \cdot L^{-1}$ BA and 0.001 $mg \cdot L^{-1}$ NAA. Glucose was used at 20.0 $g \cdot L^{-1}$ for *Calceolaria* and 30.0 $g \cdot L^{-1}$ for *Zauchneria*. Activated charcoal at 3.0 $g \cdot L^{-1}$ was used during micropropagation and rooting of *Calceolaria* only.

Rooting medium was half strength WPM (*Calceolaria*) or MS (*Zauchneria*) with 15 $g \cdot L^{-1}$ sucrose, and IBA was optimal at 1.0 $mg \cdot L^{-1}$ for *Zauchneria* and 5.0 $mg \cdot L^{-1}$ for *Calceolaria*.

Medium pH was adjusted to 5.8 and dispensed (30 ml) into glass jars with three explants per jar and re-cultured every 4–6 weeks. The culture room was at 22 ºC ± 1 with a 16 h photoperiod under Philips cool white fluorescent tubes (58.6 $\mu mol \cdot m^{-2} \cdot s^{-1}$ at bench level).

RESULTS AND DISCUSSION

Shoots of *Zauchneria* were easier to sterilise and establish than those of *Calceolaria*. Growth and development of *Calceolaria* shoots in vitro was improved with the use of activated charcoal in the multiplication medium. Production of shoot explants of *Calceolaria* increased with time and the yield of explants from shoot explants was similar to sub-apical explants (Fig. 1). Rooting was 100% in microcuttings of calceolaria with a mean of 5 roots per plant and 100% success at weaning.

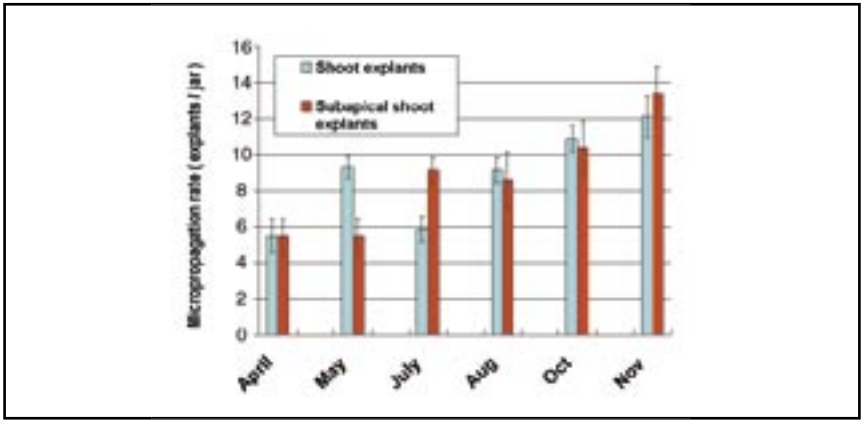

Figure 1. Effect of season and two types of explant on micropropagation rate in *Calceolaria* 'Kentish Hero'.

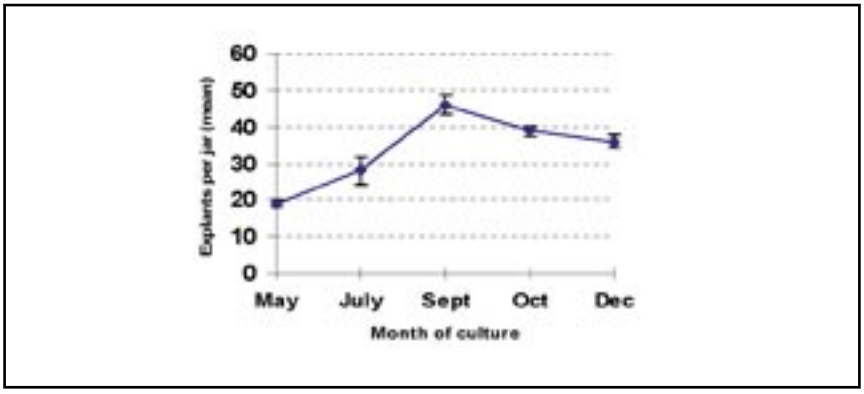

Figure 2. Micropropagation rate in *Zauchneria californica* 'Dublin'.

For *Zauchneria*, there was a similar build up in shoot productivity over time with 20–45 rootable shoots produced per culture jar per culture period (Fig. 2). Shoot cultures had thin shoots and grew in clusters. Rooting was 100% for individual shoots and 40% of shoots were weaned successfully. Better results in rooting and weaning may be possible by using shoot clusters rather than individual shoots. Provision of a means to micropropagate *Zauchneria* may facilitate the introduction of some of the new selections, which are now being developed (Robinson, 2000).

LITERATURE CITED

Lloyd, G, and **B. McCown** 1980. Commercially feasible micropropagation of mountain laurel *Kalmia latifolia* by use of shoot-tips culture. Comb. Proc. Intl Plant Prop. Soc. 30:420-427.

Murashige T. and **F. Skoog** 1962. A revised medium for rapid growth and bioassays with tobacco tissue culture Physiol. Plant.15:473-797

Robinson A. 2000. Piping hot. The Garden, 125:698- 699.