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Scientia Horticulturae 103 (2005) 381–385
SCIENTIA HORTICULTURAE
www.elsevier.com/locate/scihorti

Short communication

In vitro adventitious rooting of *Cornus florida* microshoots

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Received 13 October 2003; received in revised form 3 June 2004; accepted 9 June 2004

Abstract

Cornus florida L. (flowering dogwood) has been successfully micropropagated, but low rooting of microshoots makes the system inefficient. This study was conducted to increase rooting efficiency of flowering dogwood microshoots over that previously achieved. Microshoots originating from acclimatized axillary and nodal bud stock cultures were excised and treated with different concentrations and combinations of various auxins including indole-3-acetic acid (IAA), 1-naphthaleneacetic acid (NAA) and indole-3-butyric acid (IBA). Effect of microshoot age on rooting efficiency was also examined. Of the auxins tested, maximum rooting was observed with 4.4 μM IBA. The age of microshoot explants had a significant effect on rooting. Five to seven-week-old microshoots treated continuously with 4.9 μM IBA in Woody plant medium (WPM) consistently had the best and most consistent rooting efficiency (about 83%).

Keywords: Auxins; *Cornus florida*; Flowering dogwood; Growth regulators; Microshoots; Rooting medium

Abbreviations: BA, 6-benzylaminopurine; IAA, indole-3-acetic acid; IBA, indole-3-butyric acid; NAA, 1-naphthaleneacetic acid; WPM, Woody plant medium

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0304-4238/$ – see front matter
doi:10.1016/j.scienta.2004.06.014

1. Introduction

Cornus florida L., flowering dogwood, belongs to the Cornaceae and is a common understory and ornamental tree found in the eastern United States. Mature flowering dogwood trees can reach a height of 12 m and spread equal to or considerably greater than their height. *C. florida* flowers are small and inconspicuous whereas the red, pink or white bracts are large and the more conspicuous features of the plant. Dogwoods are mainly cultivated for their ornamental beauty and landscape value, but are also important as food for wildlife.

Generic, native white-flowering dogwood is commercially propagated from seed whereas the propagation of various cultivars is accomplished by vegetative methods such as cuttings and budding. Both of these methods depend upon the season and success can be unpredictable. Besides the typical cultural production problems, many trees in nurseries, landscapes and natural environments have been damaged by powdery mildew and dogwood anthracnose. Several different cultivars of disease resistant flowering dogwood have been developed in recent years (Windham et al., 2003). These cultivars were developed from single specimen trees and therefore rapid production of large number of trees for commercialization is a long process. A rapid, reliable and efficient method of producing flowering dogwoods through tissue culture can be used to produce multiple copies from a single tree exhibiting extraordinary horticultural attributes including disease resistance.

The first complete micropropagation of *C. florida* was accomplished by Kaveriappa et al. (1997) from nodal and apical meristems of seedlings. Microshoots were proliferated using Woody plant medium (WPM) augmented with 4.4 μM 6-benzylaminopurine (BA) and root formation was encouraged on WPM supplemented with 4.9 μM IBA. However on average, the rooting efficiency was low at 50%. In contrast, reliable rooting (100%) of *C. kousa* and *C. capitata* microshoots was achieved with NAA and IBA (Ishimaru et al., 1998), but details were not provided.

The objective of this study was to improve rooting efficiency of dogwood microshoots produced from cultures initiated from seedling material. The effect of commonly used auxins (IAA, NAA and IBA), and effect of microshoot age on adventitious rooting were explored.

2. Materials and methods

C. florida berries were collected from seven wild type flowering dogwood trees on the University of Tennessee Agricultural campus in Knoxville, Tennessee in mid-September and prepared for seed germination as described by Kaveriappa et al. (1997). In April of the following year, cultures were established using the methods reported by Kaveriappa et al. (1997) from two or three leaf pair-seedlings on WPM (Lloyd and McCown, 1980) supplemented with 30 g l^{-1} sucrose, 0.1 g l^{-1} myo-inositol, 1 mg l^{-1} thiamine, 8 g l^{-1} phytagar (Gibco) and 4.4 μM BA and pH adjusted to 5.7. They were incubated at 23 °C under 25 μmol m^{-2} s^{-1} light for a 16/8 h light/dark photoperiod. Cultures were transferred (divided and callus removed when necessary) every 5 weeks to fresh medium with the same