In Vitro Flowering of *Oxydendrum arboreum*

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During previous micropropagation experiments with sourwood [*Oxydendrum arboreum* (L.) DC. (Ericaceae)], a small to medium-sized tree native to the eastern United States, we observed flower bud development in some of the cultures. In vitro flowering has been reported in several plant species (Scorza, 1982). However, we are unaware of reports of in vitro flowering of a dicotyledonous tree species. Therefore, we investigated some of the factors that may control in vitro flowering of sourwood.

Explants were obtained from existing cultures initiated from axillary shoots of a mature tree as described by Banko and Stefani (1989). These cultures had been transferred five times at 6- to 8-week intervals without flowering (30 to 40 weeks total culture period) before we initiated our studies. Shoots, 12 mm long with seven to 10 nodes, were subcultured into 25 × 150-mm culture tubes (one shoot per tube), each containing 20 ml of woody plant medium [WPM (Lloyd and McCown, 1980)] supplemented with varying concentrations of zeatin (mixed isomers) and 0.8% Difco-Bacto agar. The medium pH was adjusted to 5.2 with 1 N NaOH before agar addition. Tubes were capped with Magenta 2-way caps (Magenta Corp., Chicago) and autoclaved for 15 min at 121C. Cultures were

sealed with parafilm and incubated at 22C in growth chambers with photoperiods of 8, 16, or 24 h of 55 to 60 μmol·m⁻²·s⁻¹ provided by cool-white fluorescent lamps. The experiment was conducted twice, with slight differences in zeatin concentration each time (Table 1). The cultures were evaluated for flower development after 8 weeks.

Flower development was observed in cultures supplemented with 2, 4, or 6 μM zeatin and incubated under 16- or 24-h photoperiods, with more cultures developing flower buds at 2 μM zeatin than at 4 or 6 μM (Fig. 1). There was no indication of flower development from any of the cultures under 8-h photoperiods. Similarly, there was no flower development with 0 or > 6 μM zeatin. Flower development was influenced by day-length, with photoperiods > 8 h required. The flower buds failed to open completely in vitro (Fig. 2). However, individual buds have been dissected and examined under a dissecting scope and found to contain stamens, a pistil, petals, and sepals.

Table 1. Effects of photoperiod and zeatin concentration on in vitro flower development of sourwood (8 weeks in culture).

Zeatin concn (μM)	Cultures developing flower buds (%) ^z					
	Photoperiod					
	8 h		16 h		24 h	
	Expt. 1	Expt. 2	Expt. 1	Expt. 2	Expt. 1	Expt. 2
0	0	0	0	0	0	0
2	0	0	6	45	81	67
4	0	0	0	18	31	19
6	---	0	---	0	---	6
8	0	0	0	0	0	0
16	0	---	0	---	0	---

¹Experiment 1 with 16 cultures/treatment; Expt. 2 with nine to 17 cultures/treatment.

Fig. 1. Cultures of sourwood incubated under a 24-h photoperiod on WPM supplemented with (left to right) 0, 2, 4, 6, or 8 μM zeatin. Note flower bud development with 2 μM zeatin (arrow, second from left).

Fig. 2. Flower buds of sourwood developing in vitro on WPM supplemented with 2 μM zeatin and incubated under a 24-h photoperiod. Scale bar = 1 mm.

An elucidation of the factors controlling flower development is important during micropropagation of sourwood because when the cultures initiate flowers, they cease multiplication of new shoots.

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