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Effect of Bioregulant on in vitro Rhizogenesis of Two Endangered Species of *citrus*

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ABSTRACT

Microshoots of two endangered species of citrus viz. *C. macroptera* Mont and *C. latipes* Tanaka were cultured on MS medium fortified with different bioregulants either alone or in combination to study the rhizogenesis. Results indicated that NAA (0.2 mg/1) alongwith Paclobutrazol (1.0 mg/1) gave best in vitro rooting in both the species.

Shoot proliferation and rhizogenesis are the two main stages of micropropagation system. Although, a great deal of work on shoot proliferation of citrus has been done. However, attempts have not been made to study the role of different bioregulants on rhizogenesis of certain endangered species of citrus. The shoots normally initiate roots either in presence of NAA or in basal medium free of cytokinin. Duran-villa et al. (1989) found 10 and 1.0 mg/1 NAA as an optimal concentration to induce rooting in *C. sinensis* and *C. aurantifolia* respectively. Hence, the present studies were undertaken to ascertain the efficacy and optimal concentration of different bioregulants for rhizogenesis in two citrus species.

MATERIAL AND METHODS

One centimeter long in vitro grown microshoots of *C.macroptera* Mont cv. Satkara and *C.latipes* Tanaka cv. Khasi papeda were cultured on MS medium (Murashige and Skoog, 1962) fortified with NAA (0.1-0.2 mg/1), Paclobutrazol (1-2.5 mg/1) and IBA (5mg/1) either alone or in combination. The medium contained 0.8% agar and 3% sucrose. The pH was adjusted to 5.7 before autoclaving. The cultures were incubated in culture room maintained at 25=2oC, 50-55 RH and 2000 lux of florescent tubelight illumination with 16/8 hour of light and dark cycling. 25 tubes formed one treatment. The data obtained 60 days after culture initiation were analysed by using factorial analysis.

RESULT AND DISCUSSION

The results represented in table 1 revealed significant differences among all the characters. *C.latipes* produced thicker and longer roots than *C. macroptera.* Maximum rooting in both the species was observed with 0.2 mg/1 NAA followed by 0.2mg/1 NAA+1 mg/1 Paclobutrazol (Table 2). Duran-villa et al. (1989) reported that best rooting in *C.aurantifolia, C.medica and C. sinensis* was achieved with 0.05 mg/1 NAA. The roots obtained from 0.2 mg/1 NAA were

thin and long. Plants having such roots died during transfer or acclimatization. NAA (0.2 mg/1) alongwith Paclobutrazol (1 mg/1) produced thick and short roots. Mortality rate was very less in such plants. Singh et al. (1997) reported that thickness of feeder root got increased when plants of *C.medica* L were soil drenched with Paclobutrazol. A significant interaction between species and bioregulant for all the characters was observed (Table 3). The maximum rooting was found with 0.2 mg/1 NAA in *C. macroptera* and 0.1 mg/1 NAA in *C.latipes* however, thickness of feeder roots was observed with Paclobutrazol alone or in combination with NAA or IBA. The results thus clearly indicated that combination of NAA (0.2 mg/1) and Paclobutrazol (1 mg/1) was very effective in inducing and modifying the roots of *C. macroptera* and *C. latipes.*

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Table 1. Mean effect of citrus species

Species	Rooting %	Root length (cm)	Root Diameter (mm)	
			Max	At tip
Satkara	69.31	2.71	0.58	0.50
Khasi Papeda	67.44	3.43	0.77	0.69
Sem	1.12	0.13	0.02	0.01
CD (0.05)	20.05	2.32	0.35	0.17

Table 2. Mean effect of bioregulants conc. on in viro rooting of citrus species

Species Cong. (mg/1)	Rooting %	Root length (cm)	Root Diameter (mm)	
			Max	At tip
MSO	33.61	3.16	0.52	0.35
MS+NAA0.1	85.42	3.38	0.52	0.34
MS+NAA0.2	88.58	3.55	0.52	0.36
MS+Paclo 1.0	44.72	2.53	0.79	0.75
MS+Paclo 2.5	41.31	2.43	1.02	0.96
MS+IBA0.5	59.58	3.26	0.55	0.38
MS+NAA0.1+P2.5	87.28	3.12	0.70	0.65
MS+NAA0.1+P2.5	85.37	2.92	0.72	0.70
MS+NAA0.2+P1	88.11	2.97	0.72	0.70
MS+NAA0.2+P2.5	80.17	2.94	0.73	0.71
MS+IBA0.5+P2.5	62.43	3.02	0.68	0.62
SEm	1.31	0.10	0.017	0.02
CD (0.05)	4.06	0.31	0.05	0.06

Table 3. Interaction between species and bioregulants

Species	MS+bioregulant (mg/1)	Rooting (%)	Root length (cm)	Root Diameter (mm) Max	At tip
Satkara	MSO	31.0	2.77	0.40	0.19
	MS+NAA0.1	79.9	3.32	0.38	0.18
	MS+NAA0.2	89.5	3.07	0.38	0.19
	MS+Paclo1.0	45.5	2.30	0.72	0.68
	MS+Paclo2.5	400.8	2.17	0.84	0.83
	MS+IBA0.5	67.4	2.87	0.41	0.19
	MS+NNA0.1+P1	84.9	2.45	0.65	0.59
	MS+NNA0.1+P2.5	82.0	2.22	0.67	0.66
	MS+NNA0.1+P1	88.1	2.98	00.68	0.66
	MS+NNA0.1+P2.5	85.6	2.97	0.69	0.67
	MS+NNA0.1+P1	69.1	2.76	0.60	0.55
	MS+NNA0.1+P2.5	67.7	2.70	0.61	0.56
K.Papeda	MSO	36.2	3.55	0.64	0.52
	MS+NAA0.1	90.9	4.35	0.67	0.51
	MS+NAA0.2	87.6	4.02	0.66	0.52
	MS+Paclo1.0	44.0	2.77	0.86	0.83
	MS+Paclo2.5	41.8	2.68	1.20	1.09
	MS+IBA0.5	51.7	3.64	0.70	0.57
	MS+NNA0.1+P1	89.6	3.80	0.74	0.70
	MS+NNA0.1+P2.5	88.7	3.62	0.76	0.74
	MS+NNA0.1+P1	88.0	2.97	0.77	0.75
	MS+NNA0.1+P2.5	74.7	2.92	0.78	0.75
	MS+NNA0.1+P1	58.6	3.48	0.72	0.61
	MS+NNA0.1+P2.5	57.1	3.35	0.74	0.67
SEm		1.85	0.14	0.20	0.02
CD (0.05)		5.73	0.43	0.06	0.06