THE EFFECT OF VARIOUS SUBSTANCES ON IN VITRO ROOTING OF TWO PEAGENOTYPES $^{\scriptscriptstyle 1}$

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In a previous note an effect on the genotype on $\underline{\text{in}}$ $\underline{\text{vitro}}$ rooting of pea shoots was shown (1). In this report the effect of various substances on $\underline{\text{in}}$ $\underline{\text{vitro}}$ rooting of two pea genotypes is reported.

Shoots of 'Proteo' and L14 (afila) genotypes were obtained either from excised buds cultured on P2 medium with BAP and IBA added (2) or from seeds cultured on P0b medium lacking hormones, according to the technique described elsewhere (3). Shoots, 10-15 mm long, were excised and cultured on a rooting medium consisting of MS salts half strength, sucrose 10 g/l, activated charcoal 2 g/l, $CaCl_2$ 220 mg/l, agar 8 g/l, pH 5.8 (2). The formation of roots was scored after about one month of culture in a growth chamber at 24C and 16h light.

Table 1 shows that when rooting was induced on the above-mentioned media, genotypic differences between Proteo and L14 were significant only when shoots were obtained on the medium with hormones. Although the presence of hormones in the proliferating medium reduced rooting in both genotypes, the decrease was different, suggesting an interaction between hormone and genotype effects. On the basis of results reported, it is not possible to relate this effect to the af locus or to other loci. The composition of the rooting medium was modified as indicated in Table 2. In these experiments all shoots were obtained from buds cultured on P2 medium.

As concerns auxins, NAA 0.2 mg/l and IBA 0.4 mg/l gave the best results. In peas, NAAl mkM was also found by Kartha et al. (4) to be the best concentration. The absence of sucrose was always detrimental, as reported elsewhere (7,8). In L14 a linear relationship between sucrose content and rooting percentage was evident. According to Maene and Debergh (5), the role of sucrose seems to be more nutritional than osmotic. L-ornithine had a strong negative- effect in both genotypes. On the other hand, 3-aminopyridine significantly improved the response of both Proteo and L14, confirming the results obtained in red clover (6).

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Table 1. Rooting percentage in two pea genotypes on shoots obtained by means of two different procedures.

Genotype	Shoots	from: : seeds on POb medium	
Proteo	(330) 54.8	(124) 93.5	
L14 (afila)	(351) 34.8	(118) 90.7	
X ²	28.6 ***	0.3	

^{***} Differences between genotypes significant at 0.001 level.

^{*} In parentheses no. of shoots analyzed.

Table 2. Effect of various substances added to the basal rooting medium on rooting percentage in Proteo (a) and L14 (b) genotypes.

(a)

Level *	NAA	IBA	Sucrose	Ornithine	Glutami ne	3-aminopyridine
	8	%	%	%		%
1	(58) 2 55.2	(28) 46.4	(56) 39.3	(56) 55.4	(55) 52.7	(51) 52.9
2	(53) 71.7	(27) 55.6	(49) 61.2	(51) 17.6	(53) 64.2	(53) 83.0
3	(54) 63.0	(25) 64.0	(44) 68.2	(55) 7.3	(46) 67.4	(49) 77.6
4	(56) 64.3	(25) 56.0	(46) 65.2	(53) 1.9	(54) 70.4	(54) 77.8
X 2	3.3	1.7	11.0*	58.2***	4.2	14.2**

(b)

Level	NAA	IBA	Sucrose	Ornithine	Glutamine	3-aminopyridine
	%	%	%	%	%	8
1	(48) 33.3	(17) 35.3	(40) 22.5	(39) 30.8	(41) 39.0	(48) 33.3
2	(52) 61.5	(15) 60.0	(38) 31.6	(39) 20.5	(48) 50.0	(52) 71.2
3	(50) 58.0	(17) 70.6	(32) 46.9	(36) 8.3	(48) 60.4	(52) 69.2
4	(50) 50.0	(15) 60.0	(37) 51.4	(37) 2.7	(45) 57.8	(53) 71.7
X ²	9.3	4.7	8.6*	13.4**	4.8	21.8***

^{*, **, ***} Differences between levels significant at 0.05, 0.01, 0.001, respectively

3-aminopyridine : 1= 0 mg/1; 2= 0.1 mg/1; 3= 0.5 mg/1; 4= 1.0 mg/1.

In parentheses no. of shoots analyzed $% \left\{ 1\right\} =\left\{ 1$

NAA, IBA: 1= 0 mg/1; 2= 0.2 mg/1; 3= 0.4 mg/1; 4= 0.6 mg/1. Sucrose: 1= 0 g/1; 2= 10 g/1; 3= 20 g/1; 4= 40 g/1. Ornithine, Glutamine: 1= 0 g/1; 2= 0.5 g/1; 3= 1.0 g/1; 4= 1.5 g/1.