

III. REPORTS FROM COOPERATORS

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Cyclic AMP as a growth promoter of dwarf (d)

Seeds of dwarf (d) were soaked and planted in either GA₃ (2.6x10⁻⁶M, K salt), GA₇ (2.6x10⁻⁶M, K salt), cyclic AMP (1x10⁻⁶M) or distilled water in a growth chamber at 25±1C. Once every 24 hr the germinating seeds were subjected to one hr of red light. The lengths of coleoptiles and mesocotyls were measured 108 hr after planting (Table 1). The lengths of both coleoptile and mesocotyl of GA₃-, GA₇- or

Table 1. Mean lengths for tissues of 108-hr seedlings (expressed in mm).

Tissue	Treatment			
	Control	GA ₃	GA ₇	cAMP
Coleoptile	22.64	31.58	25.11	29.32
Mesocotyl	9.01	16.97	20.92	11.98

cAMP-treated seeds are significantly greater than the controls, although the increase in mesocotyl length of cAMP-treatments is significantly less than that of GA₃ or GA₇ treatments. There is no evidence of a synergistic effect for GA₃ and cAMP in increasing the length of the coleoptile or mesocotyl.

Auxin production, as measured by the *Avena* section test, is increased significantly in GA₃-treated coleoptiles, but not in cAMP-treated ones. Amylase activity is increased in treated coleoptiles, but only GA₃ elicits increased amylase activity in the mesocotyl.

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Further studies on the EMS-induced dominant mutant "curled entangled"

Curled entangled (Ce) gene expression (MNL 48:15) at different stages of plant growth was studied in the progenies of selfed plants and their crosses as pollen parent to normal plants. Curling expression was noted every fifth day after germination. The homozygous plants did not survive till maturity. Plants in the selfed progenies expressed the mutant character continuously from the fifth to the twenty-fifth day; two peaks were observed, one on the tenth and the other on the twentieth day. On the other hand, in the crossed progenies about 90 percent of the plants expressed the mutant features within ten days (Table 1). In the selfed progenies

Table 1. Curled entangled gene expression in selfed and crossed progenies (figures within parentheses represent percentages).

Progeny	Family Number	Total Plants	Number of plants				
			Days after germination				
			5th	10th	15th	20th	25th
Ce/+ ×	22	1192	124 (10.41)	392 (32.88)	204 (17.12)	336 (28.18)	136 (11.41)
N × Ce/+	24	1335	829 (62.09)	356 (26.66)	125 (9.36)	16 (1.21)	9 (0.68)

more than 1/3 of the plants were late in expression and were found to be heterozygotes; most of the plants which expressed the mutant character earlier did not survive, since they were homozygotes. The expression was very effective and conspicuous in the crossed progenies. It seems possible that the induced mutant line might have some unknown factors that are influencing the mutant expression.

Earlier it was reported that the mutant trait was expressed only on the leaves, which are rolled from side to side in the form of a hollow cylinder. The expression starts between the first and fourth leaf stages and continues until the termination of the growth period. The leaves, being rolled, get entangled with each other, thus affecting their arrangement on the stem. Four types of phyllotaxy were observed in the progenies (Table 2). When all the entangled leaves of the mutant

Table 2. The effect of Ce on phyllotaxy.

Family	Handling	Total plants	Leaf arrangement			
			Distichous	Irregular	Perpendicular	One-sided
24	Control	668	172 (25.75%)	116 (17.35%)	244 (36.55%)	136 (20.35%)
	Leaves disentangled	667	642 (96.25%)	13 (1.95%)	8 (1.20%)	4 (0.60%)

were separated during the growth period, normal distichous phyllotaxy was discernible in nearly all the plants. In plants which did not receive this treatment, only 25% of the population showed a distichous arrangement. This segregation indicates the influence of another gene for the appearance of leaf orientation. A high percentage of perpendicular types was also noted in the control. This clearly demonstrates a pseudo-effect of the Ce gene on the plant type.

The Ce gene interacts with a recessive trait, liguleless (lg). Ce expression was at the one- or two-leaf stage in the majority (84.54%) of the growing seedlings carrying the liguleless marker in homozygous condition. However, in the liguled plants the expression was delayed to the three- or four-leaf stage (Table 3).

Table 3. The effect of lg on Ce expression.

Growth stage	Number of plants	
	Liguled (%)	Liguleless (%)
First leaf stage	31 (8.37)	186 (67.41)
Second " "	45 (12.16)	88 (27.16)
Third " "	197 (53.25)	42 (12.96)
Fourth " "	49 (13.25)	6 (1.85)
Fifth " "	48 (12.97)	2 (0.62)

Chandra Mouli

Leafy mutant

A recessive mutant appeared as a segregant in a population of an ear produced by a colourless kernel. This kernel was obtained following EMS treatment of A C R seeds; the plants were pollinated by c sh wx tester stock. This mutant had a few main features, of which one character proved to be monogenic. The recessive homozygous plants were taller than both the inbred lines (i.e., untreated) and the pollen parents. The mutant had increased numbers of leaves, ranging from 20 to 24 as