LOW PENETRANCE AND VARYING EXPRESSIVITY IN A CHLORAMPHENICOL-INDUCED PEA MUTANT

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In 1985 (1) I described a chloramphenicol-induced chlorophyll mutant of the pea. During 1985 and 1986 thirty-eight families comprising 1161 plants were derived from M3 plants of this asymmetric chlorophyll mutant to ascertain penetrance and expressivity of the mutant feature.

Table 1 gives the penetrance of the character in 15 plant families grown in 1985.

Table 1. Penetrance of mutant feature (1985): All the mother plants from which these families were derived had clearly shown the chlorophyll defect.

Family no.	Plants without chlorophyll defect	Plants with chlorophyll defect
1	31	-
2	23	1
3	8	-
4	12	-
5	21	1
6	14	-
7	17	1
8	10	-
9	7	7
10	7	3
11	4	1
12	6	3
13	10	3
14	7	1
15	9	1
		22

Table 1 shows that only *12* out of 208 descendents (=10.5%) showed the feature. To further investigate the problem, 15 families derived from plants of Table 1 showing the feature and 11 familes not showing the feature were investigated in 1986 (Tables 2a and 2b) .

Table 2a. Penetrance of mutant feature in familes derived from plants enumerated in Table 1: All the mother plants had shown the feature.

1986-Family no.	Derived from 1985-Family no.	Plants without chlorophyll defect	Plants with chlorophyll defect
1	7	21	-
2	9	9	3
3	9	17	1
4	9	46	8
5	9	33	11
6	9	9	2
7	9	71	1
8	9	46	3
9	12	64	12
10	13	45	5
11	13	39	3
12	13	43	4
		443	53

Table 2b. Penetrance of chlorophyll defect: None of the mother plants had shown the feature.

1986-Family no.	Derived from 1985-Family no.	Plants without chlorophyll defect	Plants with chlorophyll defect
1	7	69	1
2	7	40	-
3	7	33	-
4	7	32	1
5	9	81	3
6	9	23	4
7	9	52	-
8	9	26	1
9	9	33	8
10	9	30	-
11	14	16	2
		435	22

Thus 53 out of 496 plants manifested the mutant feature in 1986 (11.96%, a percentage similar to that of the preceding year). Table 2b shows the results of the 11 families derived from mother plants not showing the mutant feature. In this case, 7 out of 11 mother plants not showing the mutant character revealed it in their descendents. However, the overall penetrance was only about

half of that (4.8%) of the descendents of the mother plants which had clearly shown the defect. Further investigations are required to determine whether the chlorophyll defect is gradually declining and is already lost in some descendents.

Expressivity: Expressivity varied greatly. In some plants the chlorophyll defect was already visible in the seedling stage; in the majority of the cases the defect was discerned in the leaves beginning about the 10th to the 12th node of the plants; and in still other individuals only the terminal leaves of the plant showed the feature.

Crosses: Reciprocal crosses with the mother line , 'Dippes Gelbe Viktoria' (DGV), have been carried out. In none of the cases in which DGV was the female was the feature evident (13 F1 and the 11 F2 families derived from them). In the four F1 plants derived from the reciprocal cross there was one plant with the chlorophyll defect. However, because of the low penetrance of the mutant feature, contaminations cannot be excluded at present so that these crosses have to be repeated.

1. Loenning, W.-E. 1985. PNL 17:50-51.

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