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Inheritance of Two Seedling Markers in Cucumber[1]

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Abstract. **Spontaneous mutations, variegated virescent (*vvi*) and yellow plant (*yp*) in cucumber (*Cucumis sativus* L.), were controlled by single recessive genes recognizable in the cotyledonary stage and in mature plants.**

Three viable chlorophyll-deficient mutations have been reported in cucumber. Yellow cotyledons, *yc-1* (1) and *yc-2* (3), are temporarily expressed in the cotyledons. In the light sensitive mutant, *ls,* cotyledon size and color and plant growth are reduced by high light intensity (2). This paper reports on the inheritance of 2 new spontaneous mutations in which cotyledons and mature plants are affected.

Two yellow green cucumber seedlings were selected from normal green populations and used for selfing and crossing as potentially useful genetic markers. The first mutant and its selfed progeny had yellow cotyledons that turned green in 7–10 days often leaving a white margin (Fig. 1). The first and subsequent leaves started as pale yellow which became strongly variegated in a green and white pattern. Occasionally, a complete leaf turned white and eventually died. Hypocotyl, stem, and petioles were white to light green and the corolla was lighter yellow than normal. Plants grew slowly and were reduced in size. This mutant was designated as variegated virescent.

Cotyledons and subsequent growth of the second mutant and its selfed progeny were a light yellow green throughout the life cycle (Fig. 1). The yellow green plants grew slowly, but eventually reached a size comparable to that of normal plants.

F_1 plants derived from crosses between each mutant and normal green were normal in appearance indicating that the mutations were recessive. Analysis of the segregation data in the F_2 and backcross generations supported the hypothesis that each mutation was controlled by a single recessive gene (Table 1). Gene symbol designations are *vvi* for variegated virescence and *yp* for yellow plant.

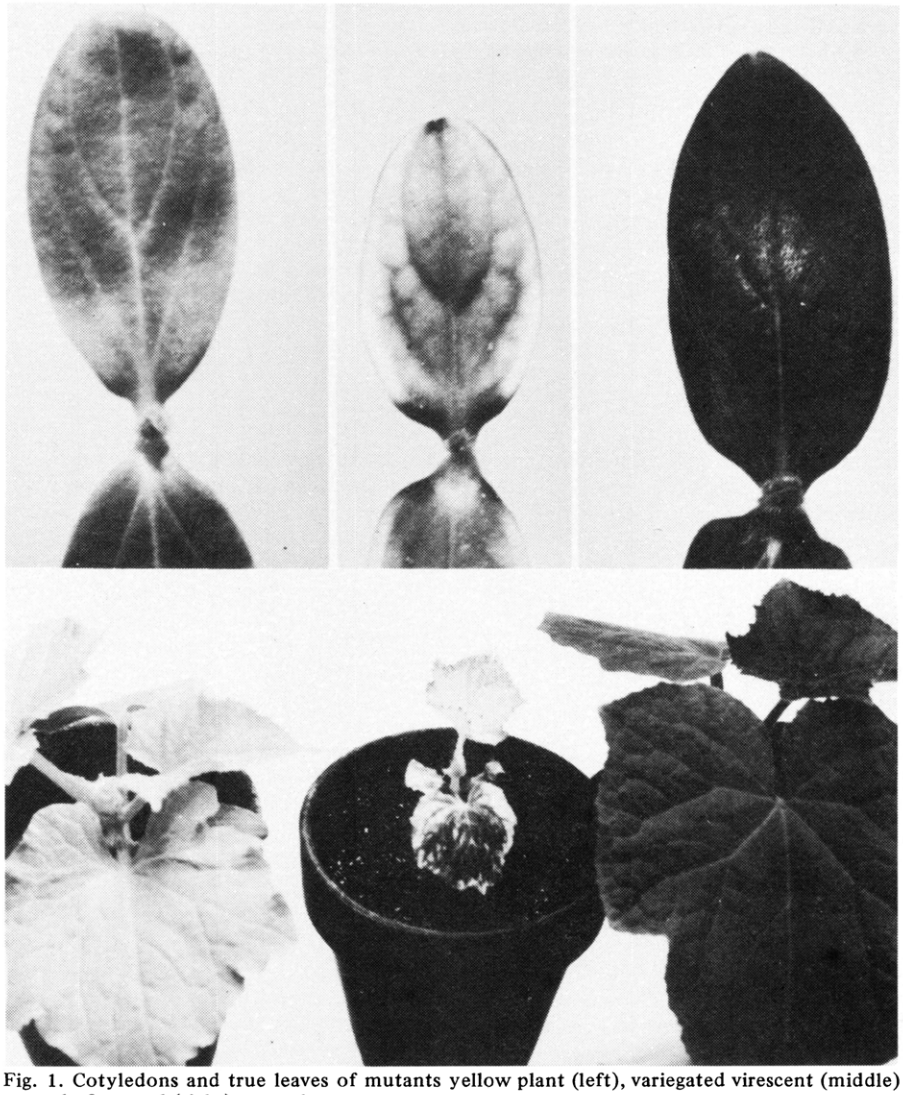

Fig. 1. Cotyledons and true leaves of mutants yellow plant (left), variegated virescent (middle) and of normal (right) cucumbers.

Table 1. Segregation of normal and the mutant plants, variegated virescent (*vvi*), and yellow plant (*yp*) in various crosses between normal and mutant cucumbers.

Generations	No. of plants		Expected ratio	X^2	P
	Normal	Mutant			
P_1 (*vvi/vvi*)	0	25			
P_2 (normal)	25	0			
F_1 ($P_1 \times P_2$)	25	0			
F_2 ($P_1 \times P_2$) selfed	293	91	3:1	0.347	0.50–0.75
BC [($P_1 \times P_2$) P_1]	20	22	1:1	0.049	0.75–0.90
P_3 *yp/yp*	0	25			
P_4 (normal)	25	0			
F_1 ($P_3 \times P_4$)	25	0			
F_2 ($P_3 \times P_4$) selfed	257	89	3:1	0.096	0.75–0.90
BC [($P_3 \times P_4$)P_4]	100	0			
BC [($P_3 \times P_4$)P_3]	70	64	1:1	0.286	0.50–0.75

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Literature Cited

1. Aalders, L. E. 1959. Yellow cotyledon, a new cucumber mutation. *Can. J. Genet. Cytol.* 1:10-12.
2. Whelan, E. D. P. 1972. Inheritance of a radiation induced light sensitive mutant of cucumber. *J. Amer. Soc. Hort. Sci.* 97:765-767.
3. ———, P. H. Williams, and Z. Abul-Hayja. 1975. The inheritance of two induced cotyledon mutants of cucumber. *HortScience* 10:267-269.