Induction of Mutations in African Violet (*Saintpaulia ionantha* Wendl.) by Ethyl Methanesulfonate[1]

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Abstract. **Ethyl methanesulfonate (EMS) applied at a concentration of .5 M for 1 hour to petioles of African violet leaf cuttings produced mutations in 13% of plantlets (which as in many species originate from a single epidermal cell).**

Although chemical mutagens have been successfully used on seeds (4), their use on vegetatively propagated material to induce somatic mutations has been rather restricted. This is believed to be due to a combination of poor penetration and high lethality leading to a very low mutation rate. My use of EMS with the African violet indicates that these problems may be at least partially overcome in some species by appropriate techniques.

Broertjes (3) has published an extensive listing of plants which vegetatively propagate from a single cell; many of these are in genera containing important ornamentals (*Begonia, Dahlia, Pelargonium, Saintpaulia, Fuschia, Petunia*) or vegetables (*Ipomoea, Brassica, Capsicum, Solanum*). In several, including *Saintpaulia*, the cell involved is epidermal. Vegetative propagation from a single epidermal cell should make especially attractive the induction of mutations by chemical mutagens.

Arisumi (1) reported fewer lethals and higher % tetraploidy when colchicine was applied to the petioles of African violet leaves if the cut end had first been allowed to callus; hence, the colchicine was not in contact with interior tissue where it would cause physiological damage. This same rationale should apply to the effective use of EMS, a powerful mutagen. To test this, leaves of several African violet cultivars[3] were allowed to callus in water for 1 week prior to treatment with EMS in .01 M phosphate buffer (pH 7), at 22°C. EMS was applied to the petioles at the times and concn listed in Table 1; 21 leaves were treated at each EMS dose except in the control where 20 leaves were used. The controls were treated in buffer only for 1 hr. Immediately after treatment, the petioles were washed for 1 hr in distilled water and then planted in vermiculite. The resulting plantlets were grown to maturity under fluorescent lights.

Table 1 suggests slight stimulation of plantlet production at intermediate doses of EMS. EMS at .5 M for 1 hr produced 13.4% mutants as compared to 0 in the controls and 2.1 and 2.3% at the other levels. This is still well below the rate obtainable with ionizing radiation (2, 5).

In the .25 M −1 hr treatment, 5 mutants were obtained: 3 flecked leaf, and 2 speckled leaf. In the .5 M−.05 hr treatment, 4 mutants were obtained: 1 double to single flower, 2 flecked, and 1 rounder leaves. The most extreme treatment, .5 M−1 hr, produced 23 mutants: 5 dwarfs, 2 mutations from double to single flower, 3 extremely early bloom, 2 lighter green leaves, 6 flecked, 3 speckled, and 2 had abnormal petals. This mutation spectrum agrees with that obtained by Sparrow (5) and Broertjes (2) with ionizing radiation on African violets. The mutations obtained in this study were accomplished with zero lethality to the treated leaves. This means that the dose could have been increased with a probable increase in mutation rate.

[1]Received for publication October 19, 1972. Scientific Paper No. 3943. College of Agriculture Research Center, Washington State University, Pullman, Projects 1068 and 1568. Supported in part by a grant from the U. S. Atomic Energy Commission Contract AT(45-1)-2221. AEC Paper RLO-2221-T2-15.
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[3]Cultivars and the no. of leaves used in each treatment are: 'Amanda'−12; 'White Lady'−3; 'Blue Boy'−3; 'Patrician'−2; 'Dr. Jekyl & Mr. Hyde'−1. Only 11 leaves of 'Amanda' were used in the control.

Table 1. Influence of ethyl methanesulfonate (EMS) dosage on plantlet production and mutation frequency in *Saintpaulia ionantha*.

EMS dosage		Total	Avg plantlets	No. plantlets	%
Concn (M)	Time (hr)	plantlets	per leaf	scored	mutants
0.0	1.0	187	9.4a[z]	113	0.0
.25	1.0	248	11.8b	215	2.3a
.5	.5	239	10.9b	188	2.1a
.5	1.0	195	9.3a	171	13.4b

[z]Mean separation within columns by Duncan's new multiple range test, 5% level.

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A New Anthocyanin from *Cornus mas* L.[1]

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Five anthocyanin 3-biosides are commonly known (4). Recently, a new one, cyanidin-3-arabinoglucoside, was added to the list (7). This short communication reports the isolation and identification of a 7th 3-bioside, pelargonidin-3-rhamnogalactoside, from the fruits of dogwood, also known as cornelian cherries (6).

Ripe berries of dogwood were extracted with 1% HCl in methanol (Table 1). The crude extract was purified and concentrated on an ion exchange resin CG-50 column (5). The purified extract was then separated by chromatographing successively, on Whatman #3 papers, in 10% formic acid, BFW, 10% formic acid, and BFW. After elution in MAW, 2 orange pigments were identified as pelargonidin-3-galactoside and pelargonidin-3-rhamnogalactoside. Their Rf values are reported in Table 2, along with pelargonidin-3-glucoside, isolated from strawberries, for comparison. Conventional

[1]Received for publication October 13, 1972.
[2]Appreciation is expressed to the Glass Container Manufacturers Institute, Washington, D. C., for financial support of this work.