A case of sectorial chimaera obtained after irradiation of *Petunia* seed

Chimera sektorialna otrzymana przez napromieniowanie nasion petunii

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This paper presents only a part of our study on the genetical and physiological effects of ionizing radiations. The material consisted of two species of *Petunia*: *P. axillaris* and *P. violacea* hybr. hort. var *superbissima* (a tetraploid variety).

The seed of *P. axillaris* was irradiated with gamma-rays (acute irradiation) from a ^{60}Co source of a strength of 130 curie, in Radzików.

Samples of 100 seeds were irradiated with the following doses: 1 kr, 2 kr and 10 kr. The seed was then sown in rows in seed-boxes on May 26, 1963 and placed in a greenhouse. After 4 weeks the plants were transplanted to pots, with fertile soil.

The effect of ionizing radiation on the germinating power of the seed is presented in Table 1.

Table 1
The effect of gamma-rays on the germinating power of *Petunia* seed

Number of the sample	Dose in kr	% of germinated seeds
1	1	98
2	2	98
3	3	97
4	4	95
5	5	81
6	6	56
7	7	30
8	8	15
9	9	7
10	10	3

Thus it can be seen that viability on seed decreased with an increase in the radiation dose. Only three plants (3 %) survived after a 10 kr dose. One of these plants was a typical sectorial chimaera, composed of green

and variegated tissue (this plant was designated by number R10/1, Fig. 1). Fig. 2 presents a schematic picture of this sectorial chimaera. In cross-section the variegated part forms a circle-sector of about 60° . All buds that grew from this sector gave variegated branches (Fig. 3).

Fig. 4. shows a leaf blade from the lower part of the mutated branch with three distinct parts, representing different degrees of colour intensity. The development of each part depends on the amount of chlorophyll

Fig. 2. Schematic presentation of the mutated sector of the plant R10/1.

A — cross-section; B — circle-section

in the cells. The white part of the leaf blade is narrower than the intermediate one, whereas the normal green is the broadest.

Generally the margins of leaves and sepals from the upper part of the mutated branch are normal-green. In Figs 5 and 6 only the leaf-and sepal-margins are normal-green. In Figs 7 and 8 flower buds of normal-green and variegated shoots are presented.

A study of the lower epidermis layer revealed the same number of chlorophyll granules in stomata cells both of the white parts of the variegated leaves and of the normal ones. The cross sections of variegated leaves revealed numerous chlorophyll granules in the mesophyll layer of the normal green parts, whereas in the white parts only few granules were present in the mesophyll cells. The colour of the light-green parts of the leaf is due to the lack of chlorophyll in the cells of the palisade layer only. It is also worth noting that the hairs on the light-green part of the leaf were much longer than those on other parts.

As far as we know the occurrence of variegated chimaera has not been reported in *Petunia* yet.

Phot. A. Lawin

Fig. 1. *Petunia axillaris*, plant R10/1 with a mutated sector of the variegata-type.
Normal branches (left) were cut off

Phot. W. Guzewski

Fig. 3. Lower part of the plant R10/1 showing variegated branches grown from the mutated sector.

Fig. 4. A leaf from the lower part of the mutated branch of plant R10/1. Notice the light-green zone between the white margin and normal-green part of the leaf blade.

Phot. W. Guzewski

Fig. 5. Leaves on the mutated branch from the upper part of the plant R10/1. Only the leaf margins are normal-green while light-green part occupies most of the leaf area

Fig. 6. A mutated calyx. Only margins of the sepals are normal green, all the rest being white

Fig. 7. Mutated flower bud

Fig. 8. Normal flower bud

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STRESZCZENIE

W roku 1963 nasiona *Petunia axillaris* zostały poddane różnym dawkom promieni gamma. Zabieg przeprowadzono w Radzikowie, natomiast całość doświadczenia w szklarni Zakładu Genetyki S.G.G.W. w Ursynowie.

W toku doświadczeń stwierdzono ujemny wpływ promieni gamma na siłę kiełkowania nasion, zwłaszcza dla dawek wyższych od LD₅₀. Dawkę 10 kr przeżyło tylko trzy rośliny, z których jedna miała charakter typowej chimery sektorialnej, przy czym zmutowane tkanki różniły się od normalnych pod względem zawartości chlorofilu. Liście wyrosłe z sektora zmutowanego były typu *variegata*, tzn. można było na nich wyróżnić 3 stopnie intensywności zielonego zabarwienia: normalnie zielone, jasnozielone oraz białe.

Badania anatomiczne wykazały, że w miększym palisadowym strefy jasnozielonej mutanta znajdowały się tylko nieliczne chloroplasty, zaś w strefie białej — również i w miększym gąbczastym — było bardzo mało chloroplastów w porównaniu z tkanką nie zmutowaną.

Dotychczas tego typu mutant petunii nie był jeszcze opisany w piśmiennictwie naukowym.