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ECOLOGICAL AND GENETIC MONITORING OF THE AGRO- AND BIODIVERSITY OF THE COASTAL ZONE OF WESTERN GEORGIA

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Georgia is one of the most outstanding countries in the world with its agro- and biodiversity. It always surprised the foreign travelers visiting Georgia centuries ago, including the well-known scientists of flora and fauna.

Scientific technological progress and increased anthropogenic factors have significantly aggravated the variation of the biocenosesof the Black Sea coast of western Georgia, which was contributed by the chemical and radioactive contamination of the environment. Marine and automobile transport make a significant contribution to chemical contamination, and radioactive contamination is mainly strengthened by the radionuclides (Cs^{137}, Sr^{90})caused by Chernobyl catastrophe.

Georgia is a transit country where thousands of lightweight and high-load vehicles are transported from Turkey, Russia, Armenia, Azerbaijan and other areas that pollute the environment with toxic pollution and harmful gases.

Studies conducted by us showed that the intensity of accumulating heavy metals (Cu, Zn, Pb, Cd) in the plant leaves on the territories adjacent to the central highways varies according to the plant species, variety and the dependence of samplingplace from the highway.A high level of heavy metal absorption (1,7–6,1 mg/kg) was observed in the tomato varieties of Vardisferi Choportula (Solanum lycopersicum) leaves (this indicator is 3 to 12 times higher than the permissible concentrations). The following place in this regard belongs to Kezhera Pkhali (a variety of Kohlrabi), cucumber and beans (a variety of ordinary beans) 5-5,8 mg/kg.Comparative analysis of heavy metal accumulation showed that the plants quite intensively absorb cadmium (Cd) as well. In this case, the amount of cadmium absorbed by them 4 to 22 times exceeds the permitted concentration.

Unlike vegetable crops, woody plantsless intensely absorb heavy metals. They include the tangerine variety broadleaved Unshiu (Citrus reticulata), Japanese Cryptomeria (Cryptomeria japonica), Silver Eucalyptus (Eucalyptus cinerea).

The research methodology of heavy metal accumulation in plants included the sampling at differentdistances (10-200 m) away from the highway. As the results of the research show, there is no substantial difference towards copper, lead and cadmium according to this criterion.As for the Zinc (Zn), its maximum volume was observed in samples taken by the immediate vicinity of the highway (10 m).

Over the years, we have learned the general frequency and range of natural mutations in citrus and tea plant at the level of cell and chromosomes. Studies have shown that in 1980 the level of natural mutations of tea plant chromosomes varied from varieties and ecological zones within the limits of 1,5 ± 0.4 – 2,5 ± 0,5%, and in citruses (variety Lemon Meyer) 1,2 ± 0, 3 – 1,4 ± 0.4. The results we obtained in 1990 were more interesting towards the tea plant variety of Colchis. For this period the level of natural mutations of chromosomes was 2.5 times higher (4,7 ± 0,5%) than in 1980. The trend of decreasing the level of mutations of chromosomes was observed in 2000 and 2010 – 3,8 ± 0.3 – 2,5 ± 0.4% (Avtandilashvili, Baratashvili and others, 2004).

For scientific analysis and reasoning of the results obtained, we conducted radiation monitoring of the research regions to identify the technogenic radionuclides. The results of the monitoring showed that different numbers of radionuclide Cs^{137} was found in the coastal zone of the western Georgia. In particular, its content in plants in 1997-2003 did not exceed 5-100 Bq/kg, and in the soil – from 100 to 700 Bq/kg. As for the period prior to 1990s, the data is completely different. According to the results of the research in May-June 1986, the content of $Cs^{137}$of various origin samples varied from 20 to 20 000Bq/kg (Mosulishvili, Shonia 1994) after Chernobyl catastrophe. In our opinion, forthe indicated periodthe increase of frequency of the natural mutation of chromosomes in tea and citrus fruits is associated with Chernobyl disaster.