

**To Obtain High Productive Drought Tolerant Legume crops'  
New Varieties by Using the Irradiation Mutagenesis**

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- Since 2014, at the LEPL Scientific Research Center of Agriculture renewed vegetable and melon crops scientific research works including legume crops' breeding and primary seed production.
- The purpose of the project is to research of local and imported genetic resources, selection of best samples, registration of new varieties and the same time conducting primary seed production.
- At the LEPL Scientific Research Center of Agriculture has been going on collaboration with International Center for Agricultural Research in the Dry Area (ICARDA), from where there were imported lot of different genetic resources.
- At the Vegetable and Melon Crops Division, based on accepted genetic resources the research works have been going on 25 different crops including 1477 varieties and genetic forms.

- Since 2019 at the LEPL Scientific Research Center of Agriculture (SRCA) there was designed the project, regarding to obtain new perspective varieties/lines using the irradiation technologies.
- Within the project experiment, there were selected three common bean varieties: “Guruli”, “Kuti saporke” and “Jumi”, which were taken from the SRCA gene bank.
- In 2019, all three varieties, at the first stage for testing on dosages, were irradiated within 5 - 100 Gy diapason, in order to identify more effective dosages. After testing on pilot irradiation there were chosen 15, 20, 25 and 30 Gy dosages for further stages.
- The irradiation procedures carried out at the I. Beritashvili experimental biomedicine center, on the basis of the laboratory of radiation safety problems, in particular, a set of radiation devices “Gamma-capsule” was used, where the isotope of radiation is  $^{137}\text{Cs}$ , 661.7 kiloelectronvolt energy.

- Since 2020, by IAEA/FAO support at the Scientific Research Center of Agriculture there was designed the project, regarding to climate change adoption, especially to obtain new high productive crop varieties using the gamma irradiation,
- Within the project experiment, there were selected the best varieties through 192 forms of Chickpea (*Cicer*) “Eleksiri” and within 57 forms of Grass pea (*Lathyrus sativus*) the perspective form #7.
- Except of pheno-phase monitoring and biometric analysis due to DUS descriptors, there were conducted DNA extraction and PCR analysis of both crops, at the DNA laboratory of the LEPL Scientific Research Center of Agriculture.

- Currently in 2024, there are obtained the M3 stage of 4 new best mutant lines of Chickpea and 8 new best mutant line of Grass pea adopted to climate change.
- Regarding to common bean irradiation procedures, within three varieties, totally there are obtained M6 stage of new 11 perspective mutant lines.
- Nowadays the plant breeding procedures are in progress and hoping to get new perspective initial materials.